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TESTPLT - INTERACTIVE COMPUTER PROCEDURE FOR WIND-TUNNEL-DATA MANAGEMENT, RETRIEVAL, COMPARISON, AND PLOTTING

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SUMMARY

A method of maintaining, retrieving, comparing, and plotting wind-tunnel data by means of an interactive remote computer terminal is described. The software associated with the method consists of two procedure files, three computer programs, and a submittal file, all of which are discussed. The procedure is based on maintaining the basic wind-tunnel data files in the Langley standard interface tape (SIFT) format. The SIFT format is not part of the present development; however, those features of the format essential to the present use are described. The entire method is illustrated by sample executions from a remote terminal.

INTRODUCTION

Despite the many recent advances in aerodynamic theory and computation, the process of aircraft design is still predominently founded on experimental data from wind-tunnel tests. The accessibility of this data, even when documented in formal reports, leaves much to be desired. Often the data is presented, without tables, in graphic form with scales inadequate to provide the required degree of precision. Runs of unforeseen significance may be omitted from the final report. Certain measured data quantities may not be presented. All of these shortcomings add to the difficulty of comparing data from slightly different models when trying to evaluate the effect of small changes. Particular difficulties are encountered when the comparisons are made with configurations tested in different wind tunnel facilities since, even when the original data files are available, differences in the standard file formats of the different facilities require special programming to extract the pertinent data.

The present paper describes an interactive computer procedure in use at the Langley Research Center. This procedure alleviates many of the foregoing problems. The system is based on procedure files which automatically execute the binary versions of several computer programs. This sytem operates on a data base stored in a convenient existing Langley Standard Interface Tape (SIFT) format. The system is capable of providing data from a mixture of different tests conducted in varying facilities, combining the data files, and presenting them in tabular form, as graphic remote terminal displays, and as inked machine-plotted figures suitable for direct copy in a final report.

The components of the interactive procedure consist of two procedure files, three computer programs, and one file providing remote-batch entry of final plotting jobs. All of these components are described herein. Their use is illustrated by copies of the display during complete sample executions. The SIFT file format is not part of the present development; however, for the sake of completeness, those SIFT format features which are pertinent to the present use are described briefly herein.

The present computer procedure is heavily dependent upon the extensive file manipulation capabilities of the Network Operating System (NOS) in use at the Langley Computer Complex. It is also dependent upon many specific graphic subroutines and upon the graphic postprocessor system used at the Langley Research Center. Because of this dependence, substantial modifications may be required to allow use of this procedure at other computer facilities. Langley Research Center users will find the required files and programs in mass storage as public files in the catalog of user number 397868N.

DISCUSSION

The following discussion consists of two major parts. In the first part, each of the files and programs involved in the TESTPLT procedure is described briefly. The second part of the discussion demonstrates the use of the TESTPLT procedure by means of sample executions which are illustrated by complete sets of copies of the display during execution.

DESCRIPTION OF FILES AND PROGRAMS

Standard Interface Tape (SIFT) Format Data Files

One primary problem in creating a central wind-tunnel data base is that the original data files vary in format and content according to the practices of the wind-tunnel facility and the nature of the particular test. The present TESTPLT procedure is designed to operate from SIFT format data files since this format allows uniform methods of access to disparate sets of data. This format has been in use for several years at the Langley Research Center and many utility programs have been developed to process data stored in this form. A number of Langley facilities use this format as standard procedure; in other cases, it is relatively simple to convert the original file to SIFT format. Although the SIFT format is not part of the present development, it is the key to the entire procedure. Therefore, the features of the SIFT format which apply to the present procedure will be described at this point.

Briefly, a SIFT-format file consists of binary records all of which have the form KEY,N,(DATA(I),I=1,N). KEY is a coded word defining the kind of information contained in the N words of DATA. The first asset of this format is that it is unnecessary to know the number of words in each record in order to read it. The exact number of words is already embedded in the record.

The first record on the file uses KEY=4HNAME. This record contains N words of 10 hollarith characters each, specifying by name the quantity stored in DATA at location I in each of the following records. This feature allows the NAME record to be searched to find the location of any desired quantity within DATA(I). It is unnecessary to know beforehand the order in which the quantities are stored on the tape. Furthermore, SIFT files of varying length and containing unrelated sets of test data can all be read by a single program without special modification.

Certain names must be present in the NAME record to insure compatibility with existing Langley SIFT-based utility programs. These names are TEST, RUN, POINT, and FACILITY. The first three of these values are generally present on the data file in any event. The name FACILITY represents an arbitrarily assigned numeric designation at the Langley Research Center. It is not required in the data items of the present procedure.

As implemented in the current procedure, the second record on the file uses KEY=4HUNIT. This record states the units of measurement in which all of the succeeding data has been stored. Numerous quantities in the data list are dimensionless. In the present usage, these items of the UNIT record may be used to store messages which are useful in orienting an interactive-terminal user with respect to the data file currently in use. Thus, the files used herein contain a statement of the test number as the unit for TEST, and an indication of the facility in which the data was obtained as the unit for FACILITY.

Subsequent records on the file have KEY=4HDATA and contain the actual floating-point numerical values of the data. The number of records of data is determined only by the number required to store all of the test data.

The final record on the file should have KEY=3HEND. This record should not contain any usable data since the data will not be used or transmitted.

Procedure File TESTPLT

The basic system described herein is controlled by procedure file TESTPLT (fig. 1). The interactive-terminal user merely retrieves this file from mass storage and sets it into execution with the command CALL,TESTPLT.

The initial actions of TESTPLT are to call sequentially the SIFT files to the point TAPE1 and then to execute a binary version of program SELECT. Program SELECT offers the user numerous choices of number of quantities, desired quantities, and run numbers, thereby allowing him to select the actual data required for analysis or plotting. In each case, the data chosen by SELECT is output on TAPE2. The data found on TAPE2 is added to data from the preceeding executions of SELECT and placed in permanent mass-storage under the name H1344. This entire file will remain available subsequent to completion of TESTPLT and may be called back for examination or for additional plotted figures.

As shown in figure 1, TESTPLT references three specific files of test data (FST369, FST402, and VSTL158). If other SIFT files are desired, it is only

necessary to alter the original command to CALL (TESTPLT(FST369=TESTA, FST402=TESTB,VSTL158=TESTC)) where TESTA, TESTB, TESTC are the names of the desired files. If less than three files are required, only the first one or two new files need be mentioned in the calling sequence. This procedure leaves the remaining files as dummies to permit continuity; the additional executions of SELECT can be averted by a single user input. In the unlikely event that more than three SIFT files are required, the additional files can be edited into TESTPLT by following the pattern of control cards shown in figure 1.

Upon completion of the data selection process, TESTPLT recalls the plotting file H1344 to TAPE1 as input to a binary version of program DATAPLT. This program, in response to user entries, prepares a figure showing the longitudinal aerodynamic characteristics of the model in the form of a SAVPLT file of pseudo plot-vectors as normally used by the Langley postprocessor plotting system. Program DATAPLT does not present a display at the terminal; it merely produces a vector file which is then saved in mass storage under the name H1222. This file remains after execution and may be recalled at any time, either for remote batch processing into final figures, or for use at the display as in the next step of the TESTPLT sequence.

Upon completion of DATAPLT, the binary version of program LOOK is retrieved and executed. The function of this program is to convert a Langley SAVPLT file to vectors suitable for interactive graphic-terminal use, and to transmit them to the terminal. Its execution causes the figure to appear on the display. Upon completion of the display, the plotted fiture will remain for about one minute to allow time for examination or copying.

Program LOOK is the only portion of TESTPLT which requires a graphic terminal. Users with nongraphic terminals can bypass LOOK by supplying it with a magnification factor of 0.

The final steps of TESTPLT are to retrieve and submit the file PLOTJOB for remote-batch processing of plotted figures by using the Langley postprocessor system. Execution terminates with a display of the dayfile of the entire interactive session.

Procedure File SHORT

Repeated usage of TESTPLT has demonstrated that the major expenditure of user time and computer resources occurs during the selection process resulting in the file H1344. Provided that sufficient data is chosen during the initial execution of TESTPLT, it is unnecessary to repeat the selection process each time. The procedure file SHORT (fig. 2) contains only the actual figure preparation control cards at the end of TESTPLT. Its use for the second and later figures to be prepared will save substantial effort.

Program SELECT

The function of program SELECT is to choose selected data from a SIFT file and to rewrite that data as a file suitable for use by a subsequent plotting program. A source listing of the program is provided in Appendix A. The input SIFT file must be placed at TAPE1 prior to execution; the output data file will be found at TAPE2 after execution.

The initial action of SELECT is to write a dummy record with a run number of 99999 on the output file in order to insure continuity of control in TESTPLT. It then provides a display of all the names and units on the SIFT file.

The process of data choice is conducted on two levels controlled by the user in response to prompting questions on the display. The first level of choice is the specification of the number and names of the quantities to be written on the output file. The quantity RUN is automatically added to the front of each line of data and should not be included as one of these quantities. As many as nine quantities may be selected. The names must be specified precisely as given in the list of names on the display. Each name is immediately checked against the list in the NAME record. If the input quantity name not found, a diagnostic message is issued, and the user is offered an additional chance to specify the name correctly.

In principle, the second level of choice from a SIFT file could be by means of configuration and operating condition variables. Unfortunately, because of limitations on the number of quantities in many wind-tunnel data-acquisition systems, the basic wind-tunnel data files seldom include a sufficient number of such quantities to completely and unambiguously define a single set of data. Thus, in practice, the selection must be based on run number, and a complete schedule of runs must be available so that the user can determine which runs he wants.

The user is offered the option of selecting all of the runs on the SIFT file. If this option is rejected, the selection process will proceed on the basis of specific selected run numbers. In the latter case, run numbers absent from the SIFT file will be rejected. In the single-run mode, the data for that run are transcribed to the display for examination, after which the user may choose whether or not the data will be written on the output file. When all the runs are specified, such a listing would be too long and it is omitted.

Program SELECT is intended to operate in an environment of several SIFT-files and certain specific features are required because of this fact. The subsequent plotting program will determine the limits of the data to be plotted as a single line solely by run number. These run numbers must be unique in the plotting data. When two or more SIFT files from different tests are accessed, many run numbers will be duplicated between the two sets of data. This confusion can be eliminated by options within SELECT which allow the user to alter the run numbers when the data is transcribed to output. Since run numbers seldom exceed three digits, the alteration is accomplished by adding some number of even thousands to the run number, thus effectively adding a new leading digit to the old run number.

As noted under the description of procedure file TESTPLT, execution of SELECT is bypassed easily if data is not required from a specific SIFT file. Execution terminates normally if the number of quantities is input as 0, if a quantity named NONE is specified, or if a run number of 0 is entered.

Program DATAPLT

The function of program DATAPLT is to prepare a file (SAVPLT) of pseudo plot vectors for use in the Langley postprocessor system or for display at the terminal by program LOOK. The particular figure produced by DATAPLT displays the longitudinal aerodynamic characteristics of the model. A source listing of program DATAPLT is presented in Appendix B. The input plot data from SELECT must be positioned at TAPE1 prior to execution, and the output, a file of psuedo plot-vectors, will be found on a system-provided file name SAVPLT. The program is dimensioned such that it can produce as many as nine runs per figure, and each data line may contain as many as 30 data points.

Other plotting programs, in absolute binary form, may be substituted in TESTPLT if other types of data (say, lateral derivatives) are to be plotted. It is merely necessary to add a parenthetical substitution statement to CALL, TESTPLT or CALL,SHORT.

Program DATAPLT plots the data in either of the graphic formats shown in figure 3. The upper right-hand (L/D) plot in figure 3(b) is a user-chosen option. The scales shown in figure 3 are default values chosen to encompass almost all the data contained in the three SIFT files shown in figure 1. These values may be altered interactively as a user option.

The data my be plotted as symbols, as lines, or as both, at the discretion of the user. Lines are always faired using a cubic-spline technique. If the user desires, the data may be smoothed by local five-point least-squares methods prior to plotting lines. Such smoothing does not alter symbols which are plotted at their original location. The overall effect of the five possible data representations is shown in figure 4.

Line and symbol characters are matched and controlled by an array called ISYM. The resulting characters corresponding to the different values of ISYM(I) are shown in figure 5. The values assigned to ISYM(I) are normally in ascending sequence as run numbers are entered at the terminal. This procedure allows some degree of control over line and symbol character. If characters unobtainable in this manner are required, the standard sequential order of ISYM can be altered as a user option.

After answering prompting questions to determine which plotting field (fig. 3) is desired and which data representation (fig. 4) is required, the program asks if the plotting parameters are to be altered. A NO answer passes to plotting runs immediately; however, a YES answer sets an extensive interactive question session into action.

Upon answering YES, the program immediately presents a list of the current values of ISYM and 25 other parameters. ISYM has already been described. The

other 25 parameters occur in five groups of five each. Their names are combinations of a prefix and a suffix. The prefix denotes the set of scales affected, and the suffix determines the type of effect on that set of scales.

The prefixes are as follows: CL defines the parameters controlling the ordinate of the lower three plots of figure 3(a); CD defines the parameters controlling the abscissa of the lower right-hand plot; CM defines the parameters controlling the ordinate of the upper plot and the abscissa of the central lower plot; AL defines the parameters controlling the abscissas of the lower left-hand plot and of the optional L/D plot (fig. 3(b)); and DL defines the parameters controlling the ordinate of the optional L/D plot.

The suffixes follow in a somewhat similar manner: SCL defines the axis scale in units per inch; MIN defines the minimum value on the scale; MAX defines the maximum value on the scale; DV defines the units between each numbered division on the scale; and GRD defines the units between grid lines on the scale.

The question session begins when the user is asked if he wishes to alter ISYM. A NO answer sends the question list immediately to the first group of five plotting parameters. A YES answer permits the new values of ISYM to be entered sequentially until either the list is exhausted or the user enters a value of 0 for ISYM.

The 25 plotting parameters are handled by groups. In each group the user is asked "DO YOU WANT TO CHANGE ANY XX PARAMETERS?", where XX represents the prefix of the group of parameters. If this class of question is answered with END, the entire question session will terminate. If answered with NO, the question list skips to the set of parameters with the next prefix. If answered YES, the next set of questions will be of the form, "DO YOU WANT TO CHANGE XXYYY?" where XX is the prefix and YYY the suffix of the plotting parameter. The questioning for this set of parameters will terminate if the question is answered END, with control passing to the next group of five parameters. If answered NO, a similar question appears for the next parameter within the group. If answered YES, the new value of the parameter is requested.

After the user either exhausts the list of parameters or terminates the question session with a suitable END response, DATAPLT supplies a list of the revised parameters on the display. The user is offered the opportunity to make further revisions by restarting the question sequence. If this option is selected, the new changes start from the last revised list of values.

At this point, the data is plotted. The program requests the run numbers one at a time. The plotting session is terminated by entering a run number of 0.

The user should be cautioned about choosing the optional L/D plot if his data base contains powered-lift data. Such data often contains negative drag coefficients and lift-drag ratio becomes infinite as the drag coefficient passes through zero. Under such circumstances the data is poorly conditoned for plotting as illustrated in figure 6.

Figures produced by DATAPLT are much more elaborate than the figures generally used at an interactive terminal. The zero lines of the grids are triply traced with slight offsets to give them greater emphasis. Similar triple tracing is used on the data lines. If a very fine grid is chosen, a multiply traced coarse grid will be traced on top of the fine grid. The lettering used for scale labels is quite ornate, requiring three to four times as many vectors as other simpler lettering routines in use at the Langley Research Center.

Program DATAPLT obviously could be streamlined further for interactive graphic terminal use. This alternative was rejected because the present form of DATAPLT yields one major advantage; that is, the pseudo plot-vector file allows direct production of final report quality figures by use of the Langley postprocessor system. These figures require only editing of the legend and the addition of a figure title before publication.

Production of figures on a terminal display or on a raster-type plotting device (such as VARIAN) seldom results in any significant registry problem Such problems can arise on sequential digital plotting devices (typified by CALCOMP) if the local pen origin shifts because of either signal imperfections or mechanical faults. As a safeguard against such faults, DATAPLT plots check symbols to the left of the plotting frame. A square is plotted before anything else and a coincident diamond is plotted as the last set of plot vectors. Not normally visible, these symbols can be brought into view with a suitable horizontal offset in the postprocessor. Their coincidence or noncoincidence provides a rapid check on the accuracy of the final figure.

Program LOOK

The function of program LOOK is to translate a Langley SAVPLT file and then to transmit it to a remote interactive graphic terminal. This program is only a minor modification of an existing Langley Research Center program. A source listing of LOOK is provided in Appendix C.

Program LOOK initially requests two items of information. The first item is the transmission (or BAUD) rate at which the graphic terminal is operated. This information is used to set the proper delay time so that no information is lost while the screen is blanked before plotting.

The second required item of information is the desired magnification. The numerical value supplied depends upon the basic scaling factor and the make and model of terminal used. It further depends on the plotting parameters used when making the SAVPLT file. Some experience is required in making a correct choice. An incorrect choice will influence the plotted data on the display but will have no effect on the SAVPLT vector file.

The magnification can also be used selectively to enlarge portions of the figure, starting from the lower left-hand corner, to allow more precise examination on the terminal display. Figure 7 shows a series of displays obtained with successively greater magnification. Again, there is no effect on the SAVPLT file. A magnification of zero will terminate LOOK immediately, thereby allowing the

use of the TESTPLT procedure from a nongraphic terminal. Under such conditions, all figures are obtained from remote-batch plotting.

Once the user supplies the required transmission rate and magnification, program LOOK proceeds. The display is blanked automatically and the figure is drawn on the display. The figure will remain for about one minute, during which it may be examined and copied if the terminal includes a hard-copy unit. After this time, or before, if the carriage-return key is depressed, the screen blanks and LOOK terminates.

Submittal File PLOTJOB

The purpose of the submittal file PLOTJOB is to provide remote-batch post-processing of the pseudo plot-vector file SAVPLT into inked plots suitable for final publication with a minimum of manual preparation. This file is shown in generic form in figure 8. It must be specialized for the individual user since it requires accounting and delivery information. It should be created and saved in the individual user's permanent file prior to executing either TESTPLT or SHORT.

Observe that the line beginning PLOT.CALPOST contains both horizontal (XO) and vertical (YO) offsets. As noted earlier, the purpose of the horizontal offset is to bring the registry checkpoints into view (see DATAPLT). The purpose of the vertical offset is to allow space to add a figure title.

SAMPLE EXECUTION OF PROCEDURE FILES

Procedure File TESTPLT

The use of the procedure will be illustrated in this section of the present paper. In this sample (fig. 9), it is presumed that the basic test, from which many figures are to be made, is Langley Full-Scale Tunnel test 369 (file FST369). In addition, comparisons are required with run 555 of test 402 in the same facility (file FST402) and run 111 of Langley V/STOL Tunnel test 158 (file VSTL158). It is presumed that the file PLOTJOB has already been placed in the user's files.

The first step is to recall TESTPLT from mass storage and then to set it into execution with the command CALL,TESTPLT (fig. 9(a)). The display soon fills with a list of the names and units present on the first data file. Examination of the units for TEST and FACILITY shows that this file is that for Full Scale Tunnel test 369.

The use of DATAPLT as the plotting program forces the user responses shown in figures 9(a) and 9(b). Four values are required, and these values are ALPHA, CL, CD, and CM in that order. Since this is the primary data file, all of the runs are selected and 3000 is added to each run number to avoid confusion with runs from other data files. Any later reference to a run from this data set

must be made in terms of the new, modified run number. The data are automatically transcribed to TAPE2 and completion of this task is signalled by the final message of figure 9(b).

The data of TAPE2 is stored in file H1344 and then the precedure file calls the next file as input to SELECT, resulting in the display shown in figure 9(c). The units of TEST and FACILITY show that this is the data file for Full Scale Tunnel test 402.

Observe that the list of names in this file differs from the list of the previous file (fig. 9(a)). This difference occurs since the first file was for a powered test and the current file (fig. 9(c) contains data for an unpowered test. Nevertheless, the current file does contain the required quantities and the responses to the next several prompting questions are identical to the earlier case.

Since only one run is required from the current data file, the option to select all of the runs is rejected (fig. 9(d)), leading to a request for a run number. As soon as the run number (555.) is supplied, the display shows the data from that run. The user is then offered the opportunity to alter the run number, the option of saving the data, and then the opportunity of selecting another run. A NO answer to the last question terminates operation on this data file, after which the selected data is added to the data already saved in file H1344.

The third data file is now used as input to SELECT, and figure 9(e) shows this file to be that for V/STOL tunnel test 158. Again the same quantities are needed; however, the program rejects CL since it can not be found in the list of names (fig. 9(f)). Examination of the list (fig. 9(e)) shows that wind-axis coefficients are absent; however, in this case, the stability-axis coefficients are present and will suffice. These latter coefficients then entered and accepted (fig. 9(f)).

Again only a single run is required; thus, the run-number mode is selected. Figure 9(f) demonstrates that the program rejects a run number which is absent from the file; however, it does accept (fig. 9(g) the desired run (111.). Figure 9(g) also shows the messages and responses for altering the run number in this mode of operation.

After SELECT terminates, the data is added to that on file H1344. This file is now complete. It will be saved after completion of the entire TESTPLT sequence. Numberical comparisons of the data in file H1344 can be made by judicious use of file editing procedures (such as EDIT) available in the computer complex. In this sample case, file H1344 contains 2802 lines of data. The first and last portions of this file are shown in figure 10.

Now that the plotting data file is complete, the plotting sequences of TESTPLT begin. Program DATAPLT is executed using H1344 as input. Figure 9(h) shows the display with the prompting questions and answers in executing DATAPLT. The example is simple, using the default parameters. Observe that the run numbers, one from each data file, are specified in their altered form. Upon completion of DATAPLT, the SAVPLT file of pseudo plotting vectors is saved in file H1222

from which it may be replotted later in altered form by means of the capabilities of the postprocessor system.

The sequence now turns to presenting the plotted data on the display using program LOOK. As shown in figure 9(h), LOOK requires only the transmission rate and an appropriate magnification, both of which were discussed in the program description. If a nongraphic terminal is used, a magnification of 0 bypasses the display with all figures being obtained via the postprocessor system.

Once the required magnification factor is given, the display blanks automatically and the figure is drawn on the display (fig. 9(i)). This display will remain for about one minute after its completion, during which time it may be copied and examined.

If inked final figures are <u>not</u> required, TESTPLT should be terminated at this point to avoid submitting a remote-batch job for final figures.

After either a suitable time interval, or if the user presses the "carriage-return" key, the display will blank, the submittal file PLOTJOB will be transmitted for execution, and the entire job dayfile will be presented on the display as in figures 9(j) and 9(k). Final figures from the remote-batch job are obtained later from the central computer complex and are typified by figure 11. The previously described checkpoints, a coincident square and diamond, are shown at the left of figure 11.

Procedure File SHORT

The file of plotting data H1344 is saved after the initial execution of TESTPLT. Provided that sufficient data was chosen during the initial execution, it is not necessary to repeat the lengthy selection processes of TESTPLT. Instead, procedure file SHORT may be used to obtain plotted data for other runs or to edit the scaling of the figures.

In this sample execution, the goal is to plot only run 555 of test 402 and run 111 (renumbered 2111 on H1344) of test 158 with scales more suited to final publication than the default scales (figs. 6, 9(c), and 11). The optional lift-drag ratio plot is desired. Figure 12 shows the terminal displays during execution.

The procedure is initiated by retrieving SHORT from mass storage and setting it into execution with the command CALL,SHORT (fig. 12(a)). The display presentations commence in figure 12(a) with the questions seen earlier in figure 9(h). Figure 12(a) demonstrates that one of the available data representations must be chosen. In this case, the optional L/D plot is chosen, and the plotting parameters are to be altered.

The final YES of figure 12(a) immediately leads to a presentation of the current values of the plotting parameters as shown in figure 12(b), and the interrogation session begins with ISYM. In this case, line and symbol characters (8 and 4) to match other figures are input, and the list of ISYM is terminated with a 0 in figure 12(c). The questioning continues in the manner outlined in the

description of program DATAPLT (figs. 12(c) to 12(e)) until all of the required changes have been made. After the changes are complete, the display fills with a list of the revised parameters (fig. 12(f)). These should be examined carefully for correctness. If any change has been omitted or input incorrectly, it can still be corrected by asking for further revisions and repeating the question session.

The remaining questions and displays (fig. 12(g) to 12(c)) are analogous to those previously discussed during the sample execution of TESTPLT (fig. 9(h) to 9(k)). The returned final figure is shown in figure 13. The checkpoints, brought into view by the horizontal offset (XO) in PLOTJOB, are evident at the left edge of the figure.

CONCLUDING REMARKS

A method of maintaining, retrieving, comparing, and plotting wind-tunnel data by means of an interactive remote computer terminal has been described. The software associated with this method consists of two procedure files, three computer programs, and a submittal file, all of which have been discussed. The procedure is based on maintaining the basic wind-tunnel data files in the Langley standard interface tape (SIFT) format. Although this format is not part of the present development, those features of the SIFT format necessary to the present procedure have been discussed. The entire method is illustrated with sample executions from an interactive terminal.

APPENDIX A

SOURCE LISTING OF PROGRAM SELECT

```
      OVERLAY (LOOK,0,0)                                                LOOK      1
      PROGRAM LOOK (INPUT,OUTPUT)                                       LOOK      2
      COMMON/JTB/NFR,JREQ,IBAUD,JCCS,IJO,TFAC,IPA,IG1,IQ2,IQ3           LOOK      3
      DATA IR/5LINPUT/                                                  LOOK      4
      IPA=500                                                           LOOK      5
      NFX=0                                                             LOOK      6
      JREC=0                                                            LOOK      7
      IBAUD=120                                                         LOOK      8
      PRINT 1                                                           LOOK      9
    1 FORMAT (//1X,37HYOU ARE NOW EXECUTING PROGRAM "LOOK", /           LOOK     10
     1 1X,38HWHICH PLOTS A SAVPLT FILE ON THE TUBE. /                   LOOK     11
     2 1X,39HTO BYPASS PROGRAM, USE MAGNIFICATION=0. /                  LOOK     12
     3 1X,32HTO CONTINUE AFTER PLOT, PUSH CR. //                        LOOK     13
     4 1X,30HWHAT IS YOUR CURRENT BAUD RATE  /)                         LOOK     14
      READ 20, NBAUD                                                    LOOK     15
   20 FORMAT (I4)                                                       LOOK     16
      IF (EOF(IR))  999,21                                              LOOK     17
   21 IBAUD=NBAUD/10                                                    LOOK     18
      IF (IBAUD.EQ.300)  IBAUD=30                                       LOOK     19
      PRINT 22                                                          LOOK     20
   22 FORMAT (//1X,35HNOW, WHAT MAGNIFICATION DO YOU WANT  /)           LOOK     21
      READ 10,HARRY                                                     LOOK     22
   10 FORMAT (F10.0)                                                    LOOK     23
      IF(EOF(IR)) 8,6                                                   LOOK     24
    6 CONTINUE                                                          LOOK     25
      IF (HARRY.EQ.0.)  GO TO 999                                       LOOK     26
    8 CONTINUE                                                          LOOK     27
      CALL PSEUDO                                                       LOOK     28
      DX=RANF(A),2.                                                     LOOK     29
      DY=RANF(A)/2.                                                     LOOK     30
      CALL CALPLT(DX,DY,-3)                                             LOOK     31
    3 CALL UNPLOT (X,Y,I)                                               LOOK     32
      J = IABS(I)                                                       LOOK     33
```

```
      IF(J.GT.3) GO TO 4                                                LOOK    34
      IF(J.LT.2) GO TO 3                                                LOOK    35
      X=X*HARRY                                                         LOOK    36
      Y=Y*HARRY                                                         LOOK    37
      CALL CALPLT(X,Y,I)                                                LOOK    38
      GO TO 3                                                           LOOK    39
C                                                                       LOOK    40
C               SPECIAL CASES                                           LOOK    41
C                                                                       LOOK    42
    4 IF(I.NE.31) GO TO 5                                               LOOK    43
      CALL NFRAME                                                       LOOK    44
      DX=FANF(A)/2.                                                     LOOK    45
      DY=FANF(A)/2.                                                     LOOK    46
      CALL CALPLT(DX,DY,-3)                                             LOOK    47
      GO TO 3                                                           LOOK    48
C                                                                       LOOK    49
    5 IF(I.NE.999) GO TO 3                                              LOOK    50
      CALL CALPLT(0.,0.,999)                                            LOOK    51
  999 STOP                                                              LOOK    52
      END                                                               LOOK    53
```

APPENDIX A.- Continued

```
      SUBROUTINE UNPLOT(X,Y,IPEN)                                       LOOK    54
      COMMON/FP/F(35),IFP                                               LOOK    55
      DIMENSION BUF(513),WSA(512)                                       LOOK    56
      EXTERNAL EOD                                                      LOOK    57
      IF(NCALLS.GE.1)GO TO 20                                           LOOK    58
      DATA NCALLS/0/                                                    LOOK    59
C                                                                       LOOK    60
C     STEP 1 - - SETUP FILE.                                            LOOK    61
C                                                                       LOOK    62
      CALL FILESO(F,3LLEN,6LSAVPLT,3LWSA,WSA,3LFWB,BUF,3LBFS,513,3LMRL, LOOK    63
     1 2236,2LRT,1LU,2LRT,1LO)                                          LOOK    64
      CALL OPENM(F,3LT-9)                                               LOOK    65
      NCALLS=NCALLS+1                                                   LOOK    66
      NEXT=1                                                            LOOK    67
      MAX=0                                                             LOOK    68
```

```
C
C       STEP 2 - - IS CURRENT BUFFER EXHAUSTED.                          LOOK     60
C                                                                        LOOK     70
C                                                                        LOOK     71
   20 IF(MAX.GT.NEXT)GO TO 30                                            LOOK     72
   21 MAX=5120                                                           LOOK     73
      IFP=0                                                              LOOK     74
      NC=0                                                               LOOK     75
      CALL GET(F,WSA,ND,ND,ND,MAX,EOD)                                   LOOK     76
      MAX=SHIFT(F(2),-36)                                                LOOK     77
      MAX=MAX/10                                                         LOOK     78
      IF(IFP.GT.64)GO TO 90                                              LOOK     79
      IF(IFP.NE.0)GO TO 21                                               LOOK     80
      NEXT=1                                                             LOOK     81
C                                                                        LOOK     82
C       STEP 3 - - EXTRACT DATA FROM BUF                                 LOOK     83
C                                                                        LOOK     84
   30 X=WSA(NEXT)                                                        LOOK     85
      Y=WSA(NEXT+1)                                                      LOOK     86
      NEXT=NEXT+2                                                        LOOK     87
      IPEN=-M.A.Y                                                        LOOK     88
      DATA M/5L;;;;;;;;/                                                 LOOK     89
      Y=Y.A.M                                                            LOOK     90
      IPEN=SHIFT(IPEN,48)                                                LOOK     91
      IPEN=SHIFT(IPEN,-48)                                               LOOK     92
      GO TO 100                                                          LOOK     93
C                                                                        LOOK     94
C       STEP 9 - - E-O-F                                                 LOOK     95
C                                                                        LOOK     96
   90 IPEN=999                                                           LOOK     97
  100 RETURN                                                             LOOK     98
      END                                                                LOOK     99


      SUBROUTINE FPP                                                     LOOK    100
      COMMON/FP/F(35),IFP                                                LOOK    101
      IFP=IFETCH(F,?LFP)                                                 LOOK    102
C     PRINT 10,IFP                                                       LOOK    103
   10 FORMAT(1X,O21)                                                     LOOK    104
      RETURN                                                             LOOK    105
      END                                                                LOOK    106
```

APPENDIX B

SOURCE LISTING OF PROGRAM DATAPLT

```
      OVERLAY (DATAPLT,0,0)                                                  DATAPLT     1
      PROGRAM DATAPLT (INPUT,OUTPUT,TAPE1)                                   DATAPLT     2
      INTEGER RUN(10)                                                        DATAPLT     3
      DIMENSION ISYM(9),NPT(3),ALP(9,30),CL(9,30),CD(9,30),CM(9,30),         DATAPLT     4
     1 CA(32),CCL(32),CCD(32),CCM(32),CCD2(32),CCM2(32),BA(30),BL(30),       DATAPLT     5
     2 BM(30),BD(30),H(3),L1(10),L2(10),L3(10),L4(10),XLIM(2),YLIM(2),       DATAPLT     6
     3 XLIN(5),YLIN(5),DDL(32),DA(32)                                        DATAPLT     7
      COMMON/BPRM/ISYM,CLSCL,CLMIN,CLMAX,CLDV,CLGRD,CDSCL,CDMIN,CDMAX,       DATAPLT     8
     1 CDDV,CDGRD,CMSCL,CMMIN,CMMAX,CMDV,CMGRD,ALSCL,ALMIN,ALMAX,ALDV,       DATAPLT     9
     2 ALGRD,DLSCL,DLMIN,DLMAX,DLDV,DLGRD                                    DATAPLT    10
      NAMELIST/IN/ISYM,CLSCL,CLMIN,CLMAX,CLDV,CLGRD,CDSCL,CDMIN,CDMAX,       DATAPLT    11
     1 CDDV,CDGRD,CMSCL,CMMIN,CMMAX,CMDV,CMGRD,ALSCL,ALMIN,ALMAX,ALDV,       DATAPLT    12
     2 ALGRD,DLSCL,DLMIN,DLMAX,DLDV,DLGRD                                    DATAPLT    13
      DATA (H(I),I=1,3)/0.,0.007,-0.007/                                     DATAPLT    14
      DATA (L1(I),I=1,10)/0,9*1/                                             DATAPLT    15
      DATA (L2(I),I=1,10)/4*1,3*2,3/                                         DATAPLT    16
      DATA (L3(I),I=1,10)/1,2,8*5/                                           DATAPLT    17
      DATA (L4(I),I=1,10)/3*0,1,2,3,1,2,3,1/                                 DATAPLT    18
      DATA (XLIM(I),I=1,2)/0.,40./                                           DATAPLT    19
      DATA (YLIM(I),I=1,2)/0.,30./                                           DATAPLT    20
      DATA (XLIN(I),I=4,5)/0.,1./                                            DATAPLT    21
      DATA (YLIN(I),I=4,5)/0.,1./                                            DATAPLT    22
      SPAC=0.08                                                              DATAPLT    23
      LCD=1GHL/D                                                             DATAPLT    24
      DO 70  I=1,9                                                           DATAPLT    25
   70 ISYM(I)=I                                                              DATAPLT    26
      IL=1                                                                   DATAPLT    27
      CLSCL=0.4                                                              DATAPLT    28
      CLMIN=-0.4                                                             DATAPLT    29
      CLMAX=1.6                                                              DATAPLT    30
      CLDV=0.4                                                               DATAPLT    31
      CLGRD=0.2                                                              DATAPLT    32
      CDSCL=0.2                                                              DATAPLT    33
```

```
      CDMIN=-0.2                                                        DATAPLT    34
      CDMAX=1.2                                                         DATAPLT    35
      CDDV=0.2                                                          DATAPLT    36
      CDGRD=0.1                                                         DATAPLT    37
      CMSCL=0.1                                                         DATAPLT    38
      CMMIN=-0.2                                                        DATAPLT    39
      CMMAX=0.2                                                         DATAPLT    40
      CMDV=0.1                                                          DATAPLT    41
      CMGRD=0.05                                                        DATAPLT    42
      ALSCL=10.                                                         DATAPLT    43
      ALMIN=-10.                                                        DATAPLT    44
      ALMAX=40.                                                         DATAPLT    45
      ALDV=10.                                                          DATAPLT    46
      ALGRD=5.                                                          DATAPLT    47
      DLSCL=2.                                                          DATAPLT    48
      DLMIN=-4.                                                         DATAPLT    49
      DLMAX=8.                                                          DATAPLT    50
      DLDV=2.                                                           DATAPLT    51
      DLGRD=1.                                                          DATAPLT    52
      REWIND 1                                                          DATAPLT    53
      CALL PSEUDO                                                       DATAPLT    54
      CALL LEROY                                                        DATAPLT    55
      CALL FONTS (1)                                                    DATAPLT    56
      CALL CALPLT (1.5,1.0,-3)                                          DATAPLT    57
      WRITE 106                                                         DATAPLT    58
  106 FORMAT (//1X,40HYOU ARE NOW EXECUTING PROGRAM "DATAPLT", /        DATAPLT    59
     1 1X,42HWHICH PREPARES A LONGITUDINAL SAVPLT FILE.  /)             DATAPLT    60
  301 WRITE 302                                                         DATAPLT    61
  302 FORMAT (1X,34HDO YOU WANT BOTH SYMBOLS AND LINES  )               DATAPLT    62
      READ 107, A                                                       DATAPLT    63
  107 FORMAT (A2)                                                       DATAPLT    64
      IF (A.EQ.2HYE)  LINE=5                                            DATAPLT    65
      IF (A.EQ.2HYE)  GO TO 308                                         DATAPLT    66
      WRITE 304                                                         DATAPLT    67
  304 FORMAT (1X,24HDO YOU WANT SYMBOLS ONLY  )                         DATAPLT    68
      READ 107,  A                                                      DATAPLT    69
      IF (A.EQ.2HYE)  LINE=1                                            DATAPLT    70
      IF (A.EQ.2HYE)  GO TO 303                                         DATAPLT    71
      WRITE 305                                                         DATAPLT    72
  305 FORMAT (1X,22HDO YOU WANT LINES ONLY  )                           DATAPLT    73
```

```
      READ 107,  A                                                          DATAPLT     74
      IF (A.EQ.2HYE)  LINE=7                                                DATAPLT     75
      IF (A.EQ.2HYE)  GO TO 308                                             DATAPLT     76
      WRITE 306                                                             DATAPLT     77
  306 FORMAT (1X,49HONE OF THE LAST 3 QUESTIONS MUST BE ANSWERED YES. //)   DATAPLT     78
     1 1X,17HPLEASE TRY AGAIN.  /)                                          DATAPLT     79
      GO TO 301                                                             DATAPLT     80
  308 WRITE 309                                                             DATAPLT     81
  309 FORMAT (1X,47HDO YOU WANT THE LINES SMOOTHED THROUGH THE DATA  )      DATAPLT     82
      READ 107,  A                                                          DATAPLT     83
      IF (A.EQ.2HYE)  LINE=LINE+1                                           DATAPLT     84
  303 WRITE 108                                                             DATAPLT     85
  108 FORMAT (1X,33HDO YOU WANT THE OPTIONAL L/D PLOT  )                    DATAPLT     86
      READ 107, A                                                           DATAPLT     87
      IF (A.EQ.2HNO)  IL=0                                                  DATAPLT     88
      WRITE 110                                                             DATAPLT     89
  110 FORMAT (1X,44HDO YOU WANT TO ALTER ANY PLOTTING PARAMETERS  )         DATAPLT     90
      READ 107, A                                                           DATAPLT     91
      IF (A.EQ.2HNO)  GO TO 72                                              DATAPLT     92
      WRITE 111                                                             DATAPLT     93
  111 FORMAT (1X,46HTHE CURRENT VALUES OF THE PLOT PARAMETERS ARE: )        DATAPLT     94
      WRITE IN                                                              DATAPLT     95
   73 CALL READPRM                                                          DATAPLT     96
      WRITE 112                                                             DATAPLT     97
  112 FORMAT (1X,42HTHE NEW VALUES OF THE PLOT PARAMETERS ARE: )            DATAPLT     98
      WRITE IN                                                              DATAPLT     99
      WRITE 115                                                             DATAPLT    100
  115 FORMAT (1X,29HDO YOU NEED FURTHER REVISIONS )                         DATAPLT    101
      READ 107, A                                                           DATAPLT    102
      IF (A.EQ.2HNO)  GO TO 72                                              DATAPLT    103
      GO TO 73                                                              DATAPLT    104
C                                                                           DATAPLT    105
C       THIS SECTION PLOTS AXES                                             DATAPLT    106
C                                                                           DATAPLT    107
   72 CLDIST=(CLMAX-CLMIN)/CLSCL                                            DATAPLT    108
      CDDIST=(CDMAX-CDMIN)/CDSCL                                            DATAPLT    109
      CMDIST=(CMMAX-CMMIN)/CMSCL                                            DATAPLT    110
      ALDIST=(ALMAX-ALMIN)/ALSCL                                            DATAPLT    111
      CMVOFF=CLDIST+1.                                                      DATAPLT    112
      DLDIST=(DLMAX-DLMIN)/DLSCL                                            DATAPLT    113
```

```
      CMHOFF=ALDIST+CMDIST+1.                                          DATAPLT    114
      CDOFF=CMHOFF+1.                                                  DATAPLT    115
      DLHOFF=ALDIST+3.0                                                DATAPLT    116
      DLVOFF=CMVOFF+0.85                                               DATAPLT    117
      CALL PNTPLT (-3.5,3.0,0.12,3)                                    DATAPLT    118
      XMAJ=ALDV/ALSCL                                                  DATAPLT    119
      CALL AXES (0.,-0.15,0.,ALDIST,ALMIN,ALSCL,XMAJ,0.,1H ,0.25,-1)   DATAPLT    120
      DLOFF=DLHOFF-0.15                                                DATAPLT    121
      IF(IL.EQ.1) CALL AXES (DLOFF,DLVOFF,0.,ALDIST,ALMIN,ALSCL,XMAJ,  DATAPLT    122
     1 0.,1H ,0.25,-1)                                                 DATAPLT    123
      YMAJ=CLDV/CLSCL                                                  DATAPLT    124
      CALL AXES (-0.15,0.,90.,CLDIST,CLMIN,CLSCL,YMAJ,0.,1H ,0.25,1)   DATAPLT    125
      YMAJ=CMDV/CMSCL                                                  DATAPLT    126
      CALL AXES (-0.15,CMVOFF,90.,CMDIST,CMMIN,CMSCL,YMAJ,0.,1H ,0.25,1)DATAPLT    127
      CALL AXES (CMHOFF,-.15,180.,CMDIST,CMMIN,CMSCL,YMAJ,0.,1H ,.25,1) DATAPLT    128
      XMAJ=CDDV/CDSCL                                                  DATAPLT    129
      CALL AXES (CDOFF,-.15,0.,CDDIST,CDMIN,CDSCL,XMAJ,0.,1H ,0.25,-1)  DATAPLT    130
      YMAJ=DLDV/DLSCL                                                  DATAPLT    131
      DLVOFF=CMVOFF+1.0                                                DATAPLT    132
      DLOFF=DLHOFF-0.15                                                DATAPLT    133
      IF (IL.EQ.1) CALL AXES (DLOFF,DLVOFF,90.,DLDIST,DLMIN,DLSCL,     DATAPLT    134
     1 YMAJ,0.,1H ,0.25,1)                                             DATAPLT    135
C                                                                      DATAPLT    136
C       THIS SECTION PLOTS GRIDS                                       DATAPLT    137
C                                                                      DATAPLT    138
      SS=CMGRD/CMSCL                                                   DATAPLT    139
      MY=IFIX((CMDIST+0.01)/SS)                                        DATAPLT    140
      XS=ALGRD/ALSCL                                                   DATAPLT    141
      NX=IFIX((ALDIST+0.01)/XS)                                        DATAPLT    142
      CALL GRID (0.,CMVOFF,XS,SS,NX,MY)                                DATAPLT    143
      SX=DLGRD/DLSCL                                                   DATAPLT    144
      MMY=IFIX((DLDIST+0.01)/SX)                                       DATAPLT    145
      IF (IL.EQ.1)  CALL GRID (DLHOFF,DLVOFF,XS,SX,NX,MMY)             DATAPLT    146
      YS=CLGRD/CLSCL                                                   DATAPLT    147
      NY=IFIX((CLDIST+0.01)/YS)                                        DATAPLT    148
      CALL GRID (0.,0.,YS,YS,NX,NY)                                    DATAPLT    149
      XSTART=CMHOFF-CMDIST                                             DATAPLT    150
      CALL GRID (XSTART,0.,SS,YS,MY,NY)                                DATAPLT    151
      XS=CDGRD/CDSCL                                                   DATAPLT    152
      NX=IFIX((CDDIST+0.01)/XS)                                        DATAPLT    153
```

```
      CALL GRID (CDOFF,0.,XS-YS,NX,NY)                                  DATAPLT    154
      DECIDE=CLDV/CLGRD                                                 DATAPLT    155
      IF (DECIDE.LE.4.)  GO TO 23                                       DATAPLT    156
      DO 24  I=1,3                                                      DATAPLT    157
      SS=CMDV/CMSCL                                                     DATAPLT    158
      MY=IFIX((CMDIST+0.001)/SS)                                        DATAPLT    159
      XS=ALDV/ALSCL                                                     DATAPLT    160
      NX=IFIX((ALDIST+0.01)/XS)                                         DATAPLT    161
      CALL GRID (0.,CMVOFF,XS,SS,NX,MY)                                 DATAPLT    162
      SX=DLDV/DLSCL                                                     DATAPLT    163
      MMY=IFIX((DLDIST+0.01)/SX)                                        DATAPLT    164
      IF (IL.EQ.1)  CALL GRID (DLHOFF,DLVOFF,XS,SX,NX,MMY)              DATAPLT    165
      YS=CLDV/CLSCL                                                     DATAPLT    166
      NY=IFIX((CLDIST+0.01)/YS)                                         DATAPLT    167
      CALL GRID (0.,0.,XS,YS,NX,NY)                                     DATAPLT    168
      CALL GRID (XSTART,0.,SS,YS,MY,NY)                                 DATAPLT    169
      XS=CDDV/CDSCL                                                     DATAPLT    170
      NX=IFIX((CDDIST+0.01)/XS)                                         DATAPLT    171
      CALL GRID (CDOFF,0.,XS,YS,NX,NY)                                  DATAPLT    172
   24 CONTINUE                                                          DATAPLT    173
C                                                                       DATAPLT    174
C       THIS SECTION DARKENS THE ZERO LINES                             DATAPLT    175
C                                                                       DATAPLT    176
   23 CCL(1)=CCL(3)=CCM(3)=0.                                           DATAPLT    177
      CA(4)=CCL(4)=CCM(4)=CCM2(4)=CCD2(4)=1.                            DATAPLT    178
      CCL(2)=CLDIST                                                     DATAPLT    179
      CCM(1)=CMVOFF                                                     DATAPLT    180
      CCM(2)=CMVOFF+CMDIST                                              DATAPLT    181
      CA(3)=0.007                                                       DATAPLT    182
      IF (ALMAX.LT.0..OR.ALMIN.GT.0.)  GO TO 51                         DATAPLT    183
      CA(1)=CA(2)=-ALMIN/ALSCL                                          DATAPLT    184
      DO 52  I=1,2                                                      DATAPLT    185
      IF (I.EQ.2)  CA(3)=-0.007                                         DATAPLT    186
      CALL LINPLT (CA,CCL,2,1,0,0,0,0)                                  DATAPLT    187
      CALL LINPLT (CA,CCM,2,1,0,0,0,0)                                  DATAPLT    188
   52 CONTINUE                                                          DATAPLT    189
   51 IF (CMMAX.LT.0..OR.CMMIN.GT.0.)  GO TO 53                         DATAPLT    190
      CCM2(1)=CCM2(2)=CMHOFF+CMMIN/CMSCL                                DATAPLT    191
      CCM2(3)=0.007                                                     DATAPLT    192
      DO 54  I=1,2                                                      DATAPLT    193
```

APPENDIX B.- Continued

```
      IF (I.EQ.2)  CCM2(3)=-0.007                                       DATAPLT    194
      CALL LINPLT (CCM2,CCL,2,1,0,0,0,0)                                DATAPLT    195
   54 CONTINUE                                                          DATAPLT    196
   53 IF (CDMAX.LT.0..OR.CDMIN.GT.0.)  GO TO 55                         DATAPLT    197
      CCD2(1)=CCD2(2)=CDOFF-CDMIN/CDSCL                                 DATAPLT    198
      CCD2(3)=0.007                                                     DATAPLT    199
      DO 56  I=1,2                                                      DATAPLT    200
      IF (I.EQ.2)  CCD2(3)=-0.007                                       DATAPLT    201
      CALL LINPLT (CCD2,CCL,2,1,0,0,0,0)                                DATAPLT    202
   56 CONTINUE                                                          DATAPLT    203
   55 CA(1)=CA(3)=0.                                                    DATAPLT    204
      CA(2)=ALDIST                                                      DATAPLT    205
      CCM(1)=CCM(2)=CMVOFF-CMMIN/CMSCL                                  DATAPLT    206
      CCM(3)=0.007                                                      DATAPLT    207
      IF (CMMAX.LT.0..OR.CMMIN.GT.0.)  GO TO 57                         DATAPLT    208
      DO 58  I=1,2                                                      DATAPLT    209
      IF (I.EQ.2)  CCM(3)=-0.007                                        DATAPLT    210
      CALL LINPLT (CA,CCM,2,1,0,0,0,0)                                  DATAPLT    211
   58 CONTINUE                                                          DATAPLT    212
   57 CCL(1)=CCL(2)=-CLMIN/CLSCL                                        DATAPLT    213
      CCL(3)=CCM2(3)=CCD2(3)=0.007                                      DATAPLT    214
      CCM2(1)=CMHOFF-CMDIST                                             DATAPLT    215
      CCM2(2)=CMHOFF                                                    DATAPLT    216
      CCD2(1)=CDOFF                                                     DATAPLT    217
      CCD2(2)=CDOFF+CDDIST                                              DATAPLT    218
      IF (CLMAX.LT.0..OR.CLMIN.GT.0)  GO TO 159                         DATAPLT    219
      DO 60  I=1,2                                                      DATAPLT    220
      IF (I.EQ.2)  CCL(3)=CCD2(3)=CCM2(3)=-0.007                        DATAPLT    221
      CALL LINPLT (CA  ,CCL,2,1,0,0,0,0)                                DATAPLT    222
      CALL LINPLT (CCM2,CCL,2,1,0,0,0,0)                                DATAPLT    223
      CALL LINPLT (CCD2,CCL,2,1,0,0,0,0)                                DATAPLT    224
   60 CONTINUE                                                          DATAPLT    225
  159 IF (IL.EQ.0)  GO TO 59                                            DATAPLT    226
      CA(1)=CA(2)=-ALMIN/ALSCL+DLHOFF                                   DATAPLT    227
      DDL(1)=DLVOFF                                                     DATAPLT    228
      DDL(2)=DLVOFF+DLDIST                                              DATAPLT    229
      DDL(3)=0.0                                                        DATAPLT    230
      CA(3)=-0.007                                                      DATAPLT    231
      CA(4)=DDL(4)=1.0                                                  DATAPLT    232
      IF (ALMAX.LT.0..OR.ALMIN.GT.0.) GO TO 160                         DATAPLT    233
```

APPENDIX B.- Continued

```
      DO 161 I=1,2                                                      DATAPLT    234
      CALL LINPLT (CA,DDL,2,1,0,0,0,0)                                  DATAPLT    235
      CA(3)=0.007                                                       DATAPLT    236
  161 CONTINUE                                                          DATAPLT    237
  160 CA(1)=DLHOFF                                                      DATAPLT    238
      CA(2)=DLHOFF+ALDIST                                               DATAPLT    239
      DDL(1)=DDL(2)=-DLMIN/DLSCL+DLVOFF                                 DATAPLT    240
      CA(3)=0.0                                                         DATAPLT    241
      DDL(3)=-0.007                                                     DATAPLT    242
      IF (DLMAX.LT.0..OR.DLMIN.GT.0.)  GO TO 59                         DATAPLT    243
      DO 162  I=1,2                                                     DATAPLT    244
      CALL LINPLT (CA,DDL,2,1,0,0,0,0)                                  DATAPLT    245
      DDL(3)=0.007                                                      DATAPLT    246
  162 CONTINUE                                                          DATAPLT    247
C                                                                       DATAPLT    248
C       THIS SECTION LABELS THE AXES                                    DATAPLT    249
C                                                                       DATAPLT    250
   59 XXX=-1.4                                                          DATAPLT    251
      YYY=CMVOFF+CMDIST/2.0+0.25                                        DATAPLT    252
      CALL SCRIBE (XXX,YYY,0.30,0.,1HC,0.,1,1)                          DATAPLT    253
      XX=XXX+0.3                                                        DATAPLT    254
      YYY=YYY-0.13                                                      DATAPLT    255
      CALL SCRIBE (XX,YYY,0.25,0.,1HM,0.,1,0)                           DATAPLT    256
      YYY=CLDIST/2.+0.9                                                 DATAPLT    257
      CALL SCRIBE (XXX,YYY,0.30,0.,1HC,0.,1,1)                          DATAPLT    258
      YYY=YYY-0.13                                                      DATAPLT    259
      CALL SCRIBE (XX,YYY,0.25,0.,1HL,0.,1,1)                           DATAPLT    260
      YYY=YYY-1.5                                                       DATAPLT    261
      CALL SCRIBE (XXX,YYY,0.30,0.,1HC,0.,1,1)                          DATAPLT    262
      YYY=YYY-0.13                                                      DATAPLT    263
      CALL SCRIBE (XX,YYY,0.25,0.,1HD,0.,1,1)                           DATAPLT    264
      YYY=-0.8                                                          DATAPLT    265
      YY=YYY-0.13                                                       DATAPLT    266
      XXX=ALDIST/2.-0.4                                                 DATAPLT    267
      DO 200 I=1,3                                                      DATAPLT    268
      CALL NOTATE (XXX,YYY,0.35,28,0.,-1)                               DATAPLT    269
      XXX=XXX+0.035                                                     DATAPLT    270
  200 CONTINUE                                                          DATAPLT    271
      XXX=XXX+0.3                                                       DATAPLT    272
      CALL SCRIBE (XXX,YYY,0.25,0.,5H, DEG,0.,5,0)                      DATAPLT    273
```

APPENDIX B.- Continued

```
      XXX=XSTART+CMDIST/2.-0.2                                          DATAPLT    274
      CALL SCRIBE (XXX,YYY,0.30,0.,1HC,0.,1,1)                          DATAPLT    275
      XXX=XXX+0.3                                                       DATAPLT    276
      CALL SCRIBE (XXX,YY,0.25,0.,1HM,0.,1,0)                           DATAPLT    277
      XXX=CDOFF+CDDIST/2.-0.2                                           DATAPLT    278
      CALL SCRIBE (XXX,YYY,0.30,0.,1HC,0.,1,1)                          DATAPLT    279
      XXX=XXX+0.3                                                       DATAPLT    280
      CALL SCRIBE (XXX,YY,0.25,0.,1HD,0.,1,1)                           DATAPLT    281
      IF (IL.EQ.0)  GO TO 157                                           DATAPLT    282
      XXX=DLHOFF-1.4                                                    DATAPLT    283
      YYY=DLVOFF+DLDIST/2.+0.2                                          DATAPLT    284
      CALL SCRIBE (XXX,YYY,0.30,0.,3HL/D,0.,3,9)                        DATAPLT    285
      YYY=DLVOFF-0.8                                                    DATAPLT    286
      XXX=DLHOFF+ALDIST/2.-0.4                                          DATAPLT    287
      DO 201 I=1,3                                                      DATAPLT    288
      CALL NOTATE (XXX,YYY,0.35,28,0.,-1)                               DATAPLT    289
      XXX=XXX+0.095                                                     DATAPLT    290
  201 CONTINUE                                                          DATAPLT    291
      XXX=XXX+0.3                                                       DATAPLT    292
      CALL SCRIBE (XXX,YYY,0.25,0.,5H, DEG,0.,5,0)                      DATAPLT    293
      GO TO 158                                                         DATAPLT    294
C                                                                       DATAPLT    295
C       THIS SECTION COMPUTES THE LOCATION OF THE KEY TO THE SYMBOLS    DATAPLT    296
C                                                                       DATAPLT    297
  157 XLIN(1)=ALDIST+2.0                                                DATAPLT    298
      XLIN(2)=XLIN(1)+0.5*SPAC/0.05                                     DATAPLT    299
      XLIN(3)=XLIN(2)+0.6*SPAC/0.05                                     DATAPLT    300
      IF (LINE.LE.4)  YLIN(2)=CDOFF+CDDIST+3.                           DATAPLT    301
      XXXXX=XLIN(3)+0.5                                                 DATAPLT    302
      IF (LINE.LE.4)  YYYYY=XLIN(2)+0.5                                 DATAPLT    303
      YLIN(1)=YLIN(2)=YLIN(3)=CMVOFF+3.5                                DATAPLT    304
      IF (LINE.LE.4)  YLIN(1)=YLIN(2)=YLIN(3)=0.75*(CMVOFF+CMDIST)      DATAPLT    305
      GO TO 156                                                         DATAPLT    306
  158 XLIN(1)=CDDIST+CDOFF+0.5                                          DATAPLT    307
      XLIN(2)=XLIN(1)+0.6*SPAC/0.05                                     DATAPLT    308
      XLIN(3)=XLIN(2)+0.6*SPAC/0.05                                     DATAPLT    309
      XXXXX=XLIN(3)+0.5                                                 DATAPLT    310
      YLIN(1)=YLIN(2)=YLIN(3)=2.*(CMVOFF+CMDIST)/3.                     DATAPLT    311
      IF (LINE.LE.4)  XXXXX=XLIN(2)+0.5                                 DATAPLT    312
```

```
C
C       THIS SECTION READS AND STORES THE DATA
C
  156 DO 7  I=1,9                                                        DATAPLT   313
    7 NPT(I)=0                                                           DATAPLT   314
      WRITE 310                                                          DATAPLT   315
  310 FORMAT (1X,43HSTATE FIRST RUN NO., USING A DECIMAL POINT.  )       DATAPLT   316
      DO 13  I=1,9                                                       DATAPLT   317
  311 READ 312,  ARUN                                                    DATAPLT   318
  312 FORMAT (F6.3)                                                      DATAPLT   319
      LRUN=IFIX(ARUN)                                                    DATAPLT   320
      IF (LRUN.LT.1)  GO TO 313                                          DATAPLT   321
      IF (LRUN.NE.ARUN)  GO TO 20                                        DATAPLT   322
    8 READ (1,105)  IRUN,ALPHA,ACL,ACD,ACM                               DATAPLT   323
  105 FORMAT (I5,4E12.5)                                                 DATAPLT   324
      IF(EOF(1))9,10                                                     DATAPLT   325
   10 IF (IRUN.EQ.LRUN)  GO TO 12                                        DATAPLT   326
      GO TO 5                                                            DATAPLT   327
   12 NPT(I)=NPT(I)+1                                                    DATAPLT   328
      J=NPT(I)                                                           DATAPLT   329
      ALP(I,J)=ALPHA                                                     DATAPLT   330
      CL(I,J)=ACL                                                        DATAPLT   331
      CD(I,J)=ACD                                                        DATAPLT   332
      CM(I,J)=ACM                                                        DATAPLT   333
      GO TO 8                                                            DATAPLT   334
    9 REWIND 1                                                           DATAPLT   335
      IF (NPT(I).GT.0)  GO TO 91                                         DATAPLT   336
      WRITE 314,LRUN                                                     DATAPLT   337
  314 FORMAT (1X,4HRUN ,I5,34H WAS NOT FOUND.  PLEASE TRY AGAIN.  )      DATAPLT   338
      GO TO 311                                                          DATAPLT   339
   20 WRITE 320,  ARUN                                                   DATAPLT   340
  320 FORMAT (1X,11HRUN NO. OF ,F7.3,19H IS NOT ACCEPTABLE.  /           DATAPLT   341
     1 1X,16HPLEASE TRY AGAIN.  )                                        DATAPLT   342
      GO TO 311                                                          DATAPLT   343
C                                                                        DATAPLT   344
C       THIS SECTION PLOTS THE DATA POINTS                               DATAPLT   345
C                                                                        DATAPLT   346
   91 RUN(I)=LRUN                                                        DATAPLT   347
      IPT=NPT(I)                                                         DATAPLT   348
      DO 14  J=1,IPT                                                     DATAPLT   349
                                                                         DATAPLT   350
                                                                         DATAPLT   351
                                                                         DATAPLT   352
```

APPENDIX B.- Continued

```
      BA(J)=ALP(I,J)                                                    DATAPLT    353
      BL(J)=CL(I,J)                                                     DATAPLT    354
      BD(J)=CD(I,J)                                                     DATAPLT    355
      BM(J)=CM(I,J)                                                     DATAPLT    356
   14 CONTINUE                                                          DATAPLT    357
      DO 15  J=1,IPT                                                    DATAPLT    358
      CCL(J)=(BL(J)-CLMIN)/CLSCL                                        DATAPLT    359
      CA(J)=(BA(J)-ALMIN)/ALSCL                                         DATAPLT    360
      CCD(J)=(BD(J)-CLMIN)/CLSCL                                        DATAPLT    361
      CCM(J)=(BM(J)-CMMIN)/CMSCL+CMVOFF                                 DATAPLT    362
      CCD2(J)=(BD(J)-CDMIN)/CDSCL+CDOFF                                 DATAPLT    363
      CCM2(J)=-(BM(J)-CMMIN)/CMSCL+CMHOFF                               DATAPLT    364
      DA(J)=CA(J)+DLVOFF                                                DATAPLT    365
      IF (IL.EQ.1)  DDL(J)=((BL(J)/BD(J))-DLMIN)/DLSCL+DLVOFF           DATAPLT    366
   15 CONTINUE                                                          DATAPLT    367
      K=IPT+1                                                           DATAPLT    368
      CA(K)=CCL(K)=CCD(K)=CCM(K)=CCD2(K)=CCM2(K)=0.                     DATAPLT    369
      DA(K)=DDL(K)=0.0                                                  DATAPLT    370
      K=IPT+2                                                           DATAPLT    371
      CA(K)=CCL(K)=CCD(K)=CCM(K)=CCD2(K)=CCM2(K)=1.                     DATAPLT    372
      DA(K)=DDL(K)=1.0                                                  DATAPLT    373
      IS=ISYM(I)                                                        DATAPLT    374
      IF (LINE.EQ.7)  GO TO 33                                          DATAPLT    375
      IF (LINE.EQ.8)  GO TO 33                                          DATAPLT    376
      CALL LINPLT (CA,CCL,IPT,1,-1,IS,3,0)                              DATAPLT    377
      CALL LINPLT (CA,CCM,IPT,1,-1,IS,3,0)                              DATAPLT    378
      CALL LINPLT (CA,CCD,IPT,1,-1,IS,3,0)                              DATAPLT    379
      CALL LINPLT (CCM2,CCL,IPT,1,-1,IS,3,0)                            DATAPLT    380
      CALL LINPLT (CCD2,CCL,IPT,1,-1,IS,3,0)                            DATAPLT    381
      IF (IL.EQ.1)  CALL LINPLT (DA,DDL,IPT,1,-1,IS,3,0)                DATAPLT    382
      IF (LINE.EQ.1)  GO TO 26                                          DATAPLT    383
C                                                                       DATAPLT    384
C       THIS SECTION PLOTS LINES USING SPLINE FITS AND LINE CHARACTER   DATAPLT    385
C                                                                       DATAPLT    386
   33 NSP=0                                                             DATAPLT    387
      IF (LINE.EQ.6)  NSP=5                                             DATAPLT    388
      IF (LINE.EQ.8)  NSP=5                                             DATAPLT    389
      M=IS                                                              DATAPLT    390
      NN=IPT                                                            DATAPLT    391
      DO 35  J=1,3                                                      DATAPLT    392
```

APPENDIX B.- Continued

APPENDIX B.- Continued

```
      CALL LINSEQ (  CA,CCL,NN,1,XLIM,YLIM,NSP,H(J),SPAC,L1(M),L2(M),    DATAPLT    393
     1 L3(M),L4(M),1)                                                    DATAPLT    394
      NN=0                                                               DATAPLT    395
   35 CONTINUE                                                           DATAPLT    396
      NN=IPT                                                             DATAPLT    397
      DO 36  J=1,3                                                       DATAPLT    398
      CALL LINSEQ (  CA,CCD,NN,1,XLIM,YLIM,NSP,H(J),SPAC,L1(M),L2(M),    DATAPLT    399
     1 L3(M),L4(M),1)                                                    DATAPLT    400
      NN=0                                                               DATAPLT    401
   36 CONTINUE                                                           DATAPLT    402
      NN=IPT                                                             DATAPLT    403
      DO 37  J=1,3                                                       DATAPLT    404
      CALL LINSEQ (  CA,CCM,NN,1,XLIM,YLIM,NSP,H(J),SPAC,L1(M),L2(M),    DATAPLT    405
     1 L3(M),L4(M),1)                                                    DATAPLT    406
      NN=0                                                               DATAPLT    407
   37 CONTINUE                                                           DATAPLT    408
      NN=IPT                                                             DATAPLT    409
      DO 38  J=1,3                                                       DATAPLT    410
      CALL LINSEQ (CCM2,CCL,NN,1,XLIM,YLIM,NSP,H(J),SPAC,L1(M),L2(M),    DATAPLT    411
     1 L3(M),L4(M),1)                                                    DATAPLT    412
      NN=0                                                               DATAPLT    413
   38 CONTINUE                                                           DATAPLT    414
      NN=IPT                                                             DATAPLT    415
      DO 39  J=1,3                                                       DATAPLT    416
      CALL LINSEQ (CCD2,CCL,NN,1,XLIM,YLIM,NSP,H(J),SPAC,L1(M),L2(M),    DATAPLT    417
     1 L3(M),L4(M),1)                                                    DATAPLT    418
      NN=0                                                               DATAPLT    419
   39 CONTINUE                                                           DATAPLT    420
      IF (IL.EQ.0)  GO TO 26                                             DATAPLT    421
      NN=IPT                                                             DATAPLT    422
      DO 164  J=1,3                                                      DATAPLT    423
      CALL LINSEQ (  DA,DDL,NN,1,XLIM,YLIM,NSP,H(J),SPAC,L1(M),L2(M),    DATAPLT    424
     1 L3(M),L4(M),1)                                                    DATAPLT    425
      NN=0                                                               DATAPLT    426
  164 CONTINUE                                                           DATAPLT    427
   26 IF (LINE.EQ.7)  GO TO 41                                           DATAPLT    428
      IF (LINE.EQ.8)  GO TO 41                                           DATAPLT    429
      CALL PNTPLT (XLIN(2),YLIN(2),IS,3)                                 DATAPLT    430
      IF (LINE.EQ.1)  GO TO 40                                           DATAPLT    431
   41 NN=3                                                               DATAPLT    432
```

```
      DO 42  J=1,9                                                      DATAPLT    433
      CALL LINSEQ (XLIN,YLIN,NN,1,XLIM,YLIM,0,H(J),SPAC,L1(M),L2(M),    DATAPLT    434
     1 L3(M),L4(M),1)                                                   DATAPLT    435
      NN=0                                                              DATAPLT    436
   42 CONTINUE                                                          DATAPLT    437
   40 YYYY=YLIN(2)-0.10                                                 DATAPLT    438
      SIZE=0.20                                                         DATAPLT    439
      WORD=FLOAT(RUN(I))                                                DATAPLT    440
      CALL NUMBER (XXXXX,YYYY,SIZE,WORD,0.,-1)                          DATAPLT    441
   43 YLIN(1)=YLIN(2)=YLIN(3)=YYYY-0.25                                 DATAPLT    442
      YYYY=YYYY-0.30                                                    DATAPLT    443
      WRITE 307,  RUN(I)                                                DATAPLT    444
  307 FORMAT (1X,4HRUN ,I5,1PH HAS BEEN PLOTTED.  /                     DATAPLT    445
     1 1X,41HENTER NEXT RUN. (USE 0. TO END PLOTTING.)  )               DATAPLT    446
   13 CONTINUE                                                          DATAPLT    447
  313 CALL PNTPLT (-3.5,8.0,13,3)                                       DATAPLT    448
      CALL NFRAME                                                       DATAPLT    449
      WRITE 114                                                         DATAPLT    450
  114 FORMAT (/1X,24HSAVPLT TAPE IS COMPLETE. )                         DATAPLT    451
  999 CALL CALPLT (0.,0.,999)                                           DATAPLT    452
      STOP                                                              DATAPLT    453
      END                                                               DATAPLT    454
```

APPENDIX B.- Continued

```
      SUBROUTINE READPRM                                                DATAPLT    455
      COMMON/RPRM/ISYM,CLSCL,CLMIN,CLMAX,CLDV,CLGRD,CDSCL,CDMIN,CDMAX,  DATAPLT    456
     1 CDDV,CDGRD,CMSCL,CMMIN,CMMAX,CMDV,CMGRD,ALSCL,ALMIN,ALMAX,ALDV,  DATAPLT    457
     2 ALGRD,DLSCL,DLMIN,DLMAX,DLDV,DLGRD                               DATAPLT    458
      DIMENSION ISYM(9),PAR1(5),PAR2(5),NAME(5)                         DATAPLT    459
      DATA (PAR1(I),I=1,5)/2HCL,2HCD,2HCM,2HAL,2HDL/                    DATAPLT    460
      DATA (PAR2(I),I=1,5)/3HSCL,3HMIN,3HMAX,3HDV ,3HGRD/               DATAPLT    461
      DATA (NAME(I),I=1,5)/6H  CL  ,6H  CD  ,6H  CM  ,6HALPHA ,6H L/D  /DATAPLT    462
      WRITE 200                                                         DATAPLT    463
  200 FORMAT (1X,29HDO YOU WANT TO CHANGE ISYM(I) )                     DATAPLT    464
      READ 101, A                                                       DATAPLT    465
      IF (A.EQ.3HNO )  GO TO 201                                        DATAPLT    466
```

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```
      DO 202  I=1,9                                                      DATAPLT    467
      NSYM=ISYM(I)                                                       DATAPLT    468
      WRITE 203, I                                                       DATAPLT    469
  203 FORMAT (1X,30HTYPE IN THE NEW VALUE OF ISYM(,I1,1H))               DATAPLT    470
      READ 204,  NSYM                                                    DATAPLT    471
  204 FORMAT (I1)                                                        DATAPLT    472
      IF (NSYM.EQ.0)  GO TO 201                                          DATAPLT    473
      ISYM(I)=NSYM                                                       DATAPLT    474
  202 CONTINUE                                                           DATAPLT    475
  201 DO 300  I=1,5                                                      DATAPLT    476
      WRITE 301, NAME(I)                                                 DATAPLT    477
  301 FORMAT (1X,26HDO YOU WISH TO CHANGE ANY ,A6,10HPARAMETERS )        DATAPLT    478
      READ 101, A                                                        DATAPLT    479
      IF (A.EQ.3HNO )  GO TO 300                                         DATAPLT    480
      IF (A.EQ.3HEND)  GO TO 99                                          DATAPLT    481
      DO 1  J=1,5                                                        DATAPLT    482
      WRITE 100, PAR1(I),PAR2(J)                                         DATAPLT    483
  100 FORMAT (1X,22HDO YOU WANT TO CHANGE ,A2,A3)                        DATAPLT    484
      READ 101,  A                                                       DATAPLT    485
      IF (A.EQ.3HEND)  GO TO 300                                         DATAPLT    486
      IF (A.EQ.3HNO )  GO TO 1                                           DATAPLT    487
  101 FORMAT (A3)                                                        DATAPLT    488
      WRITE 102,  PAR1(I),PAR2(J)                                        DATAPLT    489
  102 FORMAT (1X,25HTYPE IN THE NEW VALUE OF ,A2,A3)                     DATAPLT    490
      GO TO (2,3,4,5,6),  I                                              DATAPLT    491
    2 GO TO (11,12,13,14,15),  J                                         DATAPLT    492
   11 READ 103,  CLSCL                                                   DATAPLT    493
  103 FORMAT (F10.5)                                                     DATAPLT    494
      GO TO 1                                                            DATAPLT    495
   12 READ 103, CLMIN                                                    DATAPLT    496
      GO TO 1                                                            DATAPLT    497
   13 READ 103, CLMAX                                                    DATAPLT    498
      GO TO 1                                                            DATAPLT    499
   14 READ 103, CLDV                                                     DATAPLT    500
      GO TO 1                                                            DATAPLT    501
   15 READ 103, CLGRD                                                    DATAPLT    502
      GO TO 1                                                            DATAPLT    503
    3 GO TO (21,22,23,24,25),  J                                         DATAPLT    504
   21 READ 103, CDSCL                                                    DATAPLT    505
      GO TO 1                                                            DATAPLT    506
```

```
   22 READ 103, CDMIN                                                   DATAPLT    507
      GO TO 1                                                           DATAPLT    508
   23 READ 103, CDMAX                                                   DATAPLT    509
      GO TO 1                                                           DATAPLT    510
   24 READ 103, CDDV                                                    DATAPLT    511
      GO TO 1                                                           DATAPLT    512
   25 READ 103, CDGRD                                                   DATAPLT    513
      GO TO 1                                                           DATAPLT    514
    4 GO TO (31,32,33,34,35),   J                                       DATAPLT    515
   31 READ 103, CMSCL                                                   DATAPLT    516
      GO TO 1                                                           DATAPLT    517
   32 READ 103, CMMIN                                                   DATAPLT    518
      GO TO 1                                                           DATAPLT    519
   33 READ 103, CMMAX                                                   DATAPLT    520
      GO TO 1                                                           DATAPLT    521
   34 READ 103, CMDV                                                    DATAPLT    522
      GO TO 1                                                           DATAPLT    523
   35 READ 103, CMGRD                                                   DATAPLT    524
      GO TO 1                                                           DATAPLT    525
    5 GO TO (41,42,43,44,45),   J                                       DATAPLT    526
   41 READ 103, ALSCL                                                   DATAPLT    527
      GO TO 1                                                           DATAPLT    528
   42 READ 103, ALMIN                                                   DATAPLT    529
      GO TO 1                                                           DATAPLT    530
   43 READ 103, ALMAX                                                   DATAPLT    531
      GO TO 1                                                           DATAPLT    532
   44 READ 103, ALDV                                                    DATAPLT    533
      GO TO 1                                                           DATAPLT    534
   45 READ 103, ALGRD                                                   DATAPLT    535
      GO TO 1                                                           DATAPLT    536
    6 GO TO (51,52,53,54,55),   J                                       DATAPLT    537
   51 READ 103, DLSCL                                                   DATAPLT    538
      GO TO 1                                                           DATAPLT    539
   52 READ 103, DLMIN                                                   DATAPLT    540
      GO TO 1                                                           DATAPLT    541
   53 READ 103, DLMAX                                                   DATAPLT    542
      GO TO 1                                                           DATAPLT    543
   54 READ 103, DLDV                                                    DATAPLT    544
      GO TO 1                                                           DATAPLT    545
   55 READ 103, DLGRD                                                   DATAPLT    546
```

APPENDIX B.- Continued

```
      1 CONTINUE                                                        DATAPLT    547
    300 CONTINUE                                                        DATAPLT    548
     99 RETURN                                                          DATAPLT    549
        END                                                             DATAPLT    550



C/      LIST,NONE                                                       DATAPLT    551
        SUBROUTINE AXES (X,Y,THETA,DIST,ORIGIX,DX,TMAJ,TMIN,BCD,HGT,N)  DATAPLT    552
C                                                                       DATAPLT    553
C   MODIFIED TO ALLOW 3 DECIMAL PLACES AND ELIMINATE TICKED LINE        DATAPLT    554
C                                                                       DATAPLT    555
C       X,Y       ARE THE COORDINATES OF THE ORIGIN OF THE AXIS IN FLOATING DATAPLT    556
C                 POINT INCHES.                                         DATAPLT    557
C       THETA     IS THE ANGLE OF ROTATION MEASURED COUNTER-CLOCKWISE FROM DATAPLT    558
C                 THE X-AXIS IN FLOATING POINT DEGREES.                 DATAPLT    559
C       DIST      IS THE LENGTH OF THE AXIS IN FLOATING POINT INCHES AND DATAPLT    560
C                 SHOULD BE A MULTIPLE OF TMAJ.                         DATAPLT    561
C       ORIGIX    IS THE VALUE OF THE VARIABLE AT THE FIRST POINT OF THE DATAPLT    562
C                 AXIS IN FLOATING POINT.                               DATAPLT    563
C       DX        IS THE DIFFERENCE BETWEEN THE SECOND AND THE FIRST VALUE DATAPLT    564
C                 OF THE VARIABLE ALONG THE AXIS IN FLOATING POINT.     DATAPLT    565
C       TMAJ      IS THE DISTANCE IN FLOATING POINT INCHES FOR MAJOR TIC DATAPLT    566
C                 MARKS.  A NEGATIVE TMAJ SUPPRESSES MAGNITUDE ADJUSTMENT DATAPLT    567
C                 OF THE NUMBERS WRITTEN AT THE TIC MARKS.              DATAPLT    568
C       TMIN       IS THE DIVISIONS PER INCH IN FLOATING POINT FOR THE MINORDATAPLT    569
C                  TIC MARKS.                                           DATAPLT    570
C       BCD       IS THE CHARACTER LABEL FOR THE AXIS.                  DATAPLT    571
C       HGT       IS THE HEIGHT OF THE FULL SIZE CHARACTERS IN THE BCD  DATAPLT    572
C                 TITLE IN FLOATING POINT INCHES.                       DATAPLT    573
C       N         IS THE NUMBER OF CHARACTERS IN THE BCD TITLE.  A NEGATIVE DATAPLT    574
C                 N PLACES THE ANNOTATION ON THE CLOCKWISE SIDE OF THE AXIS DATAPLT    575
C                 AND VICE-VERSA.                                       DATAPLT    576
C                                                                       DATAPLT    577
        DATA TEN/10./                                                   DATAPLT    578
        TEMPP=0.                                                        DATAPLT    579
        IF (TMIN) 200,5,10                                              DATAPLT    580
5       TIC=0.                                                          DATAPLT    581
        GO TO 15                                                        DATAPLT    582
```

```
      TIC=1./TMIN                                                       DATAPLT    583
   15 DV=DX                                                             DATAPLT    584
      ORIGIN=ORIGIX                                                     DATAPLT    585
      TH=THETA*0.0174533                                                DATAPLT    586
      CTH=COS(TH)                                                       DATAPLT    587
      STH=SIN(TH)                                                       DATAPLT    588
      ASTH=ABS(STH)                                                     DATAPLT    589
      CTHN=N*CTH                                                        DATAPLT    590
      STHN=N*STH                                                        DATAPLT    591
      L=IABS(N)                                                         DATAPLT    592
      AL=FLOAT(L)                                                       DATAPLT    593
      ATMAJ = ABS(TMAJ)                                                 DATAPLT    594
      CATMAJ=CTH*ATMAJ                                                  DATAPLT    595
      SATMAJ=STH*ATMAJ                                                  DATAPLT    596
      HGTNUM=.75*HGT                                                    DATAPLT    597
      IF (TIC.LE.0.0.OR.TIC.GT.ATMAJ) TIC=ATMAJ                         DATAPLT    598
      NOTE=ROUND((DIST/ATMAJ+1.0))                                      DATAPLT    599
      KOUNT = NOTE-1                                                    DATAPLT    600
      IF (ASTH.GT..01) GO TO 30                                         DATAPLT    601
      XN=X                                                              DATAPLT    602
      YN = Y+(-.5 + SIGN(.986,CTHN))*HGTNUM                             DATAPLT    603
      YS = 0.                                                           DATAPLT    604
      GO TO 35                                                          DATAPLT    605
   30 XN = X+(.143-(SIGN(.343,STHN)))*HGTNUM                            DATAPLT    606
      YN = Y                                                            DATAPLT    607
      YS = -.5*HGTNUM                                                   DATAPLT    608
   35 ADY=ABS(DV)*ATMAJ                                                 DATAPLT    609
      EX=0.0                                                            DATAPLT    610
   60 ABSV=ORIGIN/TEN**EX                                               DATAPLT    611
      ADY=SIGN(ADY,DV)                                                  DATAPLT    612
      BBSV = ROUND(ABSV)                                                DATAPLT    613
      BDY = ROUND(ADY)                                                  DATAPLT    614
      IYY=3                                                             DATAPLT    615
      ACK=(FLOAT(INT(BDY)))*1000.                                       DATAPLT    616
      ADC=FLOAT(INT((BDY*1000.)))                                       DATAPLT    617
      IF (ADC.NE.ACK)  GO TO 65                                         DATAPLT    618
      ACK=(FLOAT(INT(BBSV)))*1000.                                      DATAPLT    619
      ADC=FLOAT(INT((BBSV*1000.)))                                      DATAPLT    620
      IF (ADC.NE.ACK)  GO TO 70                                         DATAPLT    621
      IYY=-1                                                            DATAPLT    622
```

```
      GO TO 79                                                          DATAPLT    623
   65 ACK=(FLOAT(INT((BDY*10.))))*100.                                  DATAPLT    624
      IF (ADC.NE.ACK)  GO TO 75                                         DATAPLT    625
   70 ACK=(FLOAT(INT((BBSV*10.))))*100.                                 DATAPLT    626
      ADC=(FLOAT(INT((BBSV*1000.))))                                    DATAPLT    627
      IF (ADC.NE.ACK)  GO TO 76                                         DATAPLT    628
      IYY=1                                                             DATAPLT    629
   75 ACK=(FLOAT(INT((BDY*100.))))*10.                                  DATAPLT    630
      IF (ADC.NE.ACK)  GO TO 79                                         DATAPLT    631
   76 ACK=(FLOAT(INT(BBSV*100.)))*10.                                   DATAPLT    632
      ADC=(FLOAT(INT(BBSV*1000.)))                                      DATAPLT    633
      IF (ADC.NE.ACK)  GO TO 79                                         DATAPLT    634
      IYY=2                                                             DATAPLT    635
   79 IF (IYY-1)  80,85,90                                              DATAPLT    636
80    COUNT=0.0                                                         DATAPLT    637
      GO TO 95                                                          DATAPLT    638
85    COUNT=2.0                                                         DATAPLT    639
      GO TO 95                                                          DATAPLT    640
90    COUNT=3.0                                                         DATAPLT    641
      IF (IYY-2)  95,95,91                                              DATAPLT    642
   91 COUNT=4.0                                                         DATAPLT    643
95    DO 135 I=1,NOTE                                                   DATAPLT    644
      TCOUNT=COUNT                                                      DATAPLT    645
      IXX=IYY                                                           DATAPLT    646
      IF (ABSV) 105,100,105                                             DATAPLT    647
100   IXX=-1                                                            DATAPLT    648
      TCOUNT=1.0                                                        DATAPLT    649
      GO TO 115                                                         DATAPLT    650
105   IF (ABSV.LT.0.0) TCOUNT=TCOUNT+1.0                                DATAPLT    651
      TABSV=ROUND(ABSV)                                                 DATAPLT    652
110   IABSV=TABSV                                                       DATAPLT    653
      IF (IABSV.EQ.0) GO TO 115                                         DATAPLT    654
      TCOUNT=TCOUNT+1.                                                  DATAPLT    655
      TABSV=TABSV*0.10                                                  DATAPLT    656
      GO TO 110                                                         DATAPLT    657
115   YR=YN                                                             DATAPLT    658
      IF (I.EQ.1) GO TO 117                                             DATAPLT    659
      IF (I.LT.KOUNT) GO TO 118                                         DATAPLT    660
  117 YN = YN + YS                                                      DATAPLT    661
  118 CONTINUE                                                          DATAPLT    662
```

```
      TEMP=TCOUNT*HGTNUM*.857                                          DATAPLT    663
      IF (TEMP.GT.TEMPP) TEMPP=TEMP                                    DATAPLT    664
      IF (ASTH.LT..01) GO TO 120                                       DATAPLT    665
      IF (STHN.GT.0.0) GO TO 125                                       DATAPLT    666
      XR=XN                                                            DATAPLT    667
      GO TO 130                                                        DATAPLT    668
  120 XR=XN-.5*TEMP+.143*HGTNUM                                        DATAPLT    669
      GO TO 130                                                        DATAPLT    670
  125 XR=XN-TEMP                                                       DATAPLT    671
  130 CALL NUMBER (XR,YR,HGTNUM,ABSV,0.0,IXX)                          DATAPLT    672
      ABSV=ABSV+ADY                                                    DATAPLT    673
      XN=XN+CATMAJ                                                     DATAPLT    674
  135 YN=YN+SATMAJ                                                     DATAPLT    675
      TEMP=TEMPP                                                       DATAPLT    676
      IF (EX.EQ.0.0) GO TO 145                                         DATAPLT    677
      IF (CTH.LT.(-.5)) GO TO 140                                      DATAPLT    678
      XN=XN-CATMAJ*.5                                                  DATAPLT    679
      YN=YN-SATMAJ*.75                                                 DATAPLT    680
  140 CALL NOTATE (XN,YN,.8*HGTNUM,3H X ,0.0,3)                        DATAPLT    681
      CALL NOTATE (999.,999.,HGTNUM,2H10,0.0,2)                        DATAPLT    682
      CALL WHERE (XN,YN,DUM)                                           DATAPLT    683
      YN=YN+.5*HGTNUM                                                  DATAPLT    684
      CALL NUMBER (XN,YN,.6*HGTNUM,EX,0.0,-1)                          DATAPLT    685
  145 CONTINUE                                                         DATAPLT    686
  200 RETURN                                                           DATAPLT    687
      END                                                              DATAPLT    688


C/    LIST,NONE                                                        DATAPLT    689
      SUBROUTINE LINSEQ(XX,YY,NN,K,XLIM,YLIM,NSP,H,SI,L1,L2,L3,L4,L5)  DATAPLT    690
*  SUBROUTINE FOR PLOTTING SEQUENCE OF CURVED LINES USING LONG AND SHORTDATAPLT    691
*    DASHES                                                           DATAPLT    692
      DIMENSION XX(1),YY(1),XLIM(1),YLIM(1)                            DATAPLT    693
      COMMON/ARCPAR/S(103)/SCALEX/X(103)/SCALEY/Y(103)                 DATAPLT    694
      COMMON/SLOPEX/DX(103)/SLOPEY/DY(103)                             DATAPLT    695
      COMMON/CSPISE /JMAX,IERMS,RMS                                    DATAPLT    696
```

```
      JMAX=6                                                          DATAPLT    697
      IF(NN.EQ.0) GO TO 6                                             DATAPLT    698
      N=NN                                                            DATAPLT    699
      KN=K*N+1                                                        DATAPLT    700
      KNK=KN+K                                                        DATAPLT    701
      RX=1./XX(KNK)                                                   DATAPLT    702
      RY=1./YY(KNK)                                                   DATAPLT    703
*     COMPUTE SCALED  FRAME LIMITS FOR LIMPLT                         DATAPLT    704
      X=(XLIM-XX(KN))*RX                                              DATAPLT    705
      X(2)=(XLIM(2)-XX(KN))*RX                                        DATAPLT    706
      Y=(YLIM-YY(KN))*RY                                              DATAPLT    707
      Y(2)=(YLIM(2)-YY(KN))*RY                                        DATAPLT    708
      CALL LIMSET(X,Y,0)                                              DATAPLT    709
*     COMPUTE SCALED X,Y ARRAYS                                       DATAPLT    710
      DO 2 I=1,N                                                      DATAPLT    711
      KI=K*I                                                          DATAPLT    712
      X(I)=(XX(KI)-XX(KN))*RX                                         DATAPLT    713
    2 Y(I)=(YY(KI)-YY(KN))*RY                                         DATAPLT    714
*     CALL PRETRP IF PRE-INTERPOLATION IS REQUESTED (SI.LT.0)         DATAPLT    715
      IF(SI.LT.0)CALL PRETRP(N,SI)                                    DATAPLT    716
      SS=SI                                                           DATAPLT    717
*     CALL ARCALC TO COMPUTE APPROXIMATE ARC LENGTH BETWEEN DATA POINTS DATAPLT   718
      CALL ARCALC(N,0)                                                DATAPLT    719
      IF(SS.GT.S(N)) PRINT 99                                         DATAPLT    720
   99 FORMAT(/8GH **** CAUTION - REQUESTED INTERPOLATION INTERVAL IS GREDATAPLT   721
     +ATER THAN LENGTH OF CURVE/)                                     DATAPLT    722
      IF(NSP.EQ.0) GO TO 6                                            DATAPLT    723
*     SMOOTHING OF X = X(S) AND Y = Y(S) IS PERFORMED BY CALLS TO SMOOTHC DATAPLT  724
      DO 4 I=1,NSP                                                    DATAPLT    725
      DX=I                                                            DATAPLT    726
      CALL SMOOTHC(N,S,X,DX)                                          DATAPLT    727
      DX=I                                                            DATAPLT    728
    4 CALL SMOOTHC(N,S,Y,DX)                                          DATAPLT    729
      CALL ARCALC(N,0)                                                DATAPLT    730
*     CALLS TO SPISET INITIALIZE SPLINE DERIVATIVE ARRAYS DX AND DY FOR USEDATAPLT  731
*       BY SPIFUN AND SPIDER                                          DATAPLT    732
    6 CALL SPISET(N,S,X,DX)                                           DATAPLT    733
      CALL SPISET(N,S,Y,DY)                                           DATAPLT    734
*     CALL TO ARCSET INITIALIZES PEN POSITION                         DATAPLT    735
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```
    8 CALL ARCSET(H,N,0)                                                DATAPLT    736
*   CONFIGURE DESIRED SEQUENCE OF LONG AND SHORT DASHES WITH CALLS TO   DATAPLT    737
*     ARCPLT WHICH EVALUATES INTERPOLATED CURVE AND CAUSES PEN MOTION   DATAPLT    738
      IF(L1.EQ.0)GO TO 18                                               DATAPLT    739
      IF(L4.EQ.0)GO TO 20                                               DATAPLT    740
*   CALCULATE REVISED POINT SPACING AND NUMBER OF CYCLES FOR INTEGER     DATAPLT    741
*     NUMBER OF CYCLES PLUS TAIL OF LONG DASHES                         DATAPLT    742
      NIC=L2*(L3+L1)+L4*(L5+L1)                                         DATAPLT    743
      NIT=L2*(L3+L1)-L1                                                 DATAPLT    744
      NIN=S(N)/SS                                                       DATAPLT    745
      NCYC=NIN/NIC                                                      DATAPLT    746
      NIN=NCYC*NIC+NIT                                                  DATAPLT    747
      DS=S(N)/NIN                                                       DATAPLT    748
      DL1=L1*DS                                                         DATAPLT    749
*   GENERAL LINE-SEQUENCE CYCLE LOOP IS 14-LOOP                         DATAPLT    750
      DO 14 ICYC=1,NCYC                                                 DATAPLT    751
      DO 12 I2=1,L2                                                     DATAPLT    752
      CALL ARCPLT(DS,L3,2)                                              DATAPLT    753
   12 CALL ARCPLT(DL1,1,3)                                              DATAPLT    754
      DO 14 I4=1,L4                                                     DATAPLT    755
      CALL ARCPLT(DS,L5,2)                                              DATAPLT    756
   14 CALL ARCPLT(DL1,1,3)                                              DATAPLT    757
*   LOOP FOR TERMINATING TAIL OF LONG DASHES IS 16-LOOP                 DATAPLT    758
      DO 16 I2=1,L2                                                     DATAPLT    759
      CALL ARCPLT(DS,L3,2)                                              DATAPLT    760
   16 CALL ARCPLT(DL1,1,3)                                              DATAPLT    761
      RETURN                                                            DATAPLT    762
*   PLOT SOLID LINE                                                     DATAPLT    763
   18 NIN=S(N)/SS                                                       DATAPLT    764
      DS=S(N)/NIN                                                       DATAPLT    765
      CALL ARCPLT(DS,NIN,2)                                             DATAPLT    766
      RETURN                                                            DATAPLT    767
*   PLOT LINE OF LONG DASHES ONLY                                       DATAPLT    768
   20 NIC=L3+L1                                                         DATAPLT    769
      NIN=S(N)/SS                                                       DATAPLT    770
      NCYC=NIN/NIC                                                      DATAPLT    771
      NIN=NCYC*NIC-L1                                                   DATAPLT    772
      DS=S(N)/NIN                                                       DATAPLT    773
      DL1=L1*DS                                                         DATAPLT    774
      DO 22 ICYC=1,NCYC                                                 DATAPLT    775
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APPENDIX B.- Continued

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      CALL ARCPLT(DS,L3,2)                                          DATAPLT   776
   22 CALL ARCPLT(DL1,1,3)                                          DATAPLT   777
      RETURN                                                        DATAPLT   778
      END                                                           DATAPLT   779


C/    LIST,NONE                                                     DATAPLT   780
      SUBROUTINE ARCPLT(DS,L,IPEN)                                  DATAPLT   781
*  CURVE IS CALCULATED FROM SPLINE AND ARC OF LONG OR SHORT DASH IS DATAPLT   782
*    PLOTTED PEN UP OR DOWN                                        DATAPLT   783
      COMMON/ARCPAR/S(101)/SCALEX/X(101)/SCALEY/Y(101)              DATAPLT   784
      COMMON/SLOPEX/DX(101)/SLOPEY/DY(101)                          DATAPLT   785
      IF(N.NE.0) GO TO 4                                            DATAPLT   786
      DO 2 I=1,L                                                    DATAPLT   787
      SP=SP+DS                                                      DATAPLT   788
      XP=SPIFUN(SP,N,S,X,DX)                                        DATAPLT   789
      YP=SPIFUN(SP,N,S,Y,DY)                                        DATAPLT   790
    2 CALL LIMPLT(XP,YP,IPEN)                                       DATAPLT   791
      RETURN                                                        DATAPLT   792
    4 DO 6 I=1,L                                                    DATAPLT   793
      SP=SP+DS                                                      DATAPLT   794
      XP=SPIFUN(SP,N,S,X,DX)                                        DATAPLT   795
      XDOT=SPIDER(SP,N,S,X,DX)                                      DATAPLT   796
      YP=SPIFUN(SP,N,S,Y,DY)                                        DATAPLT   797
      YDOT=SPIDER(SP,N,S,Y,DY)                                      DATAPLT   798
      HS=H/SQRT(XDOT*XDOT+YDOT*YDOT)                                DATAPLT   799
      XP=XP+HS*YDOT                                                 DATAPLT   800
      YP=YP-HS*XDOT                                                 DATAPLT   801
    6 CALL LIMPLT(XP,YP,IPEN)                                       DATAPLT   802
      RETURN                                                        DATAPLT   803
                                                                    DATAPLT   804
      ENTRY ARCSET                                                  DATAPLT   805
*  ENTRY POINT ARCSET INITIALIZES H AND N, AND MOVES RAISED PEN TO  DATAPLT   806
*    BEGINNING OF CURVE                                            DATAPLT   807
      H=DS                                                          DATAPLT   808
      N=L                                                           DATAPLT   809
      SP=0                                                          DATAPLT   810
      CALL LIMPLT(X,Y,3)                                            DATAPLT   811
```

```
      IF(H.EQ.0)  RETURN                                                DATAPLT   812
      HS=H/SQRT(DX*DX+DY*DY)                                            DATAPLT   813
      XP=X+HS*DY                                                        DATAPLT   814
      YP=Y-HS*DX                                                        DATAPLT   815
      CALL LIMPLT(XP,YP,3)                                              DATAPLT   816
      RETURN                                                            DATAPLT   817
       END                                                              DATAPLT   818

C/     LIST,NONE                                                        DATAPLT   819
       SUBROUTINE PRETRP(N,SI)                                          DATAPLT   820
*   N X,Y POINTS ARE INTERPOLATED AS Y = Y(Y) TO GIVE 2*N-1 POINTS IF X DATAPLT   821
*     IS MONOTONICALLY INCREASING.  IF NOT, POINTS ARE INTERPOLATED AS   DATAPLT   822
*     X=X(Y) IF Y IS MONOTONICALLY INCREASING, OTHERWISE RETURN.         DATAPLT   823
       COMMON/ARCPAR/S(101)/SCALEX/X(101)/SCALEY/Y(101)                 DATAPLT   824
       COMMON/SLOPEX/DX(101)/SLOPEY/DY(101)                             DATAPLT   825
       SI=-SI                                                           DATAPLT   826
       DO 1 I=2,N                                                       DATAPLT   827
       IF(X(I).LE.X(I-1)) GO TO 4                                       DATAPLT   828
     1 CONTINUE                                                         DATAPLT   829
       DO 2 I=1,N                                                       DATAPLT   830
       S(I)=X(I)                                                        DATAPLT   831
     2 DY(I)=Y(I)                                                       DATAPLT   832
       CALL SPISET(N,S,DY,DX,RMSX)                                      DATAPLT   833
       DO 3 I=2,N                                                       DATAPLT   834
       I1=I+I-2                                                         DATAPLT   835
       I2=I1+1                                                          DATAPLT   836
       X(I2)=S(I)                                                       DATAPLT   837
       Y(I2)=DY(I)                                                      DATAPLT   838
       X(I1)=.5*(S(I-1)+S(I))                                           DATAPLT   839
     3 Y(I1)=SPIFUN(X(I1),N,S,DY,DX)                                    DATAPLT   840
       N=2*N-1                                                          DATAPLT   841
       RETURN                                                           DATAPLT   842
     4 DO 5 I=2,N                                                       DATAPLT   843
       IF(Y(I).LE.Y(I-1)) RETURN                                        DATAPLT   844
     5 CONTINUE                                                         DATAPLT   845
       DO 6 I=1,N                                                       DATAPLT   846
       S(I)=Y(I)                                                        DATAPLT   847
     6 DX(I)=X(I)                                                       DATAPLT   848
       CALL SPISET(N,S,DX,DY,RMSY)                                      DATAPLT   849
```

```
      DO 7 I=2,N                                                        DATAPLT    850
      I1=I+I-2                                                          DATAPLT    851
      I2=I1+1                                                           DATAPLT    852
      Y(I2)=S(I)                                                        DATAPLT    853
      X(I2)=DX(I)                                                       DATAPLT    854
      Y(I1)=.5*(S(I-1)+S(I))                                            DATAPLT    855
    7 X(I1)=SPIFUN(Y(I1),N,S,DX,DY)                                     DATAPLT    856
      N=2*N-1                                                           DATAPLT    857
      RETURN                                                            DATAPLT    858
       END                                                              DATAPLT    859


C/    LIST,NONE                                                         DATAPLT    860
      SUBROUTINE SPISET(N,X,Y,D)                                        DATAPLT    861
*************************************************************************DATAPLT    862
*  THIS SUBROUTINE COMPUTES DERIVATIVES OF A NATURAL CUBIC SPLINE FOR   DATAPLT    863
*  SUBSEQUENT USE BY FUNCTION SUBPROGRAMS SPIFUN AND SPIDER.            DATAPLT    864
*  STATEMENT 3 IMPLEMENTS EQN (44), PAGE 163 OF RALSTON + WILF, VOL 2   DATAPLT    865
*  WITH NOTATION CHANGES NOTED BELOW,                                   DATAPLT    866
*                  D(I-1) FOR U(I)                                      DATAPLT    867
*                  W      FOR OMEGA = 4.*(2.-SQRT(3.))                  DATAPLT    868
*                  Y(I)   FOR G(I)                                      DATAPLT    869
*                  X(I)   FOR B(I)                                      DATAPLT    870
*  THE DO LOOPS IN THE SUBPROGRAM PERFORM THE FOLLOWING TASKS,          DATAPLT    871
*    1 LOOP REPLACES X BY DIFFERENCES AND Y BY DIVIDED DIFFERENCES.     DATAPLT    872
*    2 LOOP REPLACES X BY SUBDIAGONALS (EQN (43) OF REF), Y BY 3* SECONDDATAPLT    873
*       DIVIDED DIFFERENCES, AND PUTS STARTING SECOND DERIVATIVES IN D. DATAPLT    874
*    3 LOOP SOLVES EQN (41) OF REF BY OVERRELAXATION USING JMAX         DATAPLT    875
*       ITERATIONS (DEFAULT VALUE OF JMAX IS 20).                       DATAPLT    876
*    4 LOOP UNDOES 2 LOOP.                                              DATAPLT    877
*    5 LOOP REPLACES SECOND DERIVATIVES BY FIRST DERIVATIVES (AVERAGE OFDATAPLT    878
*       LEFT AND RIGHT).                                                DATAPLT    879
*    7 LOOP COMPUTES RMS JUMP IN SECOND DERIVATIVES IF IFRMS=1.         DATAPLT    880
*    9 LOOP UNDOES 1 LOOP.                                              DATAPLT    881
*************************************************************************DATAPLT    882
      DIMENSION X(1),Y(1),D(1)                                          DATAPLT    883
      COMMON/CSPISET/JMAX,IFRMS,RMS                                     DATAPLT    884
      DATA JMAX,IFRMS,R6,W/20,0,.166666666666667,1.071796769724497/     DATAPLT    885
      D(1)=D(N)=0                                                       DATAPLT    886
```

```
      DO 1 II=2,N                                                          DATAPLT    887
      I=N+2-II                                                             DATAPLT    888
      X(I)=X(I)-X(I-1)                                                     DATAPLT    889
    1 Y(I)=(Y(I)-Y(I-1))/X(I)                                              DATAPLT    890
      IF(N.EQ.2) GO TO 5                                                   DATAPLT    891
      DO 2 II=3,N                                                          DATAPLT    892
      I=N+3-II                                                             DATAPLT    893
      D(I-1)=2.*(Y(I)-Y(I-1))/(X(I)+X(I-1))                                DATAPLT    894
      Y(I)=1.5*D(I-1)                                                      DATAPLT    895
    2 X(I)=.5*X(I-1)/(X(I)+X(I-1))                                         DATAPLT    896
      DO 3 J=1,JMAX                                                        DATAPLT    897
      DO 3 I=3,N                                                           DATAPLT    898
    3 D(I-1)=W*(Y(I)-X(I)*D(I-2)-(.5-X(I))*D(I))-(W-1.)*D(I-1)             DATAPLT    899
      DO 4 I=3,N                                                           DATAPLT    900
      X(I)=X(I-1)*(.5/X(I)-1.)                                             DATAPLT    901
    4 Y(I)=.3333333333333333*Y(I)*(X(I)+X(I-1))+Y(I-1)                     DATAPLT    902
    5 SAVE=Y(2)-R6*X(2)*(2.*D(1)+D(2))                                     DATAPLT    903
      DO 6 I=2,N                                                           DATAPLT    904
      C=R6*X(I)                                                            DATAPLT    905
      S1=Y(I)-C*(2.*D(I-1)+D(I))                                           DATAPLT    906
      S2=Y(I)+C*(D(I-1)+2.*D(I))                                           DATAPLT    907
      D(I-1)=.5*(SAVE+S1)                                                  DATAPLT    908
    6 SAVE=S2                                                              DATAPLT    909
      D(N)=SAVE                                                            DATAPLT    910
      IF(IFRMS.NE.1) GO TO 8                                               DATAPLT    911
      RMS=0                                                                DATAPLT    912
      IF(N.EQ.2) GO TO 8                                                   DATAPLT    913
      DO 7 I=3,N                                                           DATAPLT    914
      C=2.*D(I-1)                                                          DATAPLT    915
    7 RMS=RMS+((C+D(I-2)-3.*Y(I-1))/X(I-1)+(D(I)+C-3.*Y(I))/X(I))**2       DATAPLT    916
      RMS=2.*SQRT(RMS/N)                                                   DATAPLT    917
    8 DO 9 I=2,N                                                           DATAPLT    918
      Y(I)=Y(I)*X(I)+Y(I-1)                                                DATAPLT    919
    9 X(I)=X(I)+X(I-1)                                                     DATAPLT    920
      RETURN                                                               DATAPLT    921
       END                                                                 DATAPLT    922
```

APPENDIX B.- Continued

```
C/    LIST,NONE                                                          DATAPLT   923
      FUNCTION SPLFUN(XP,N,X,Y,D)                                        DATAPLT   924
      DIMENSION X(1),Y(1),D(1)                                           DATAPLT   925
*  EVALUATES A NATURAL CUBIC SPLINE USING SLOPE ARRAY D CALCULATED BY    DATAPLT   926
*    SPISET AND USING THE INPUT DATA ARRAYS X AND Y.                     DATAPLT   927
      IF(XP.LE.X(1)) GO TO 6                                             DATAPLT   928
      DO 2 I=2,N                                                         DATAPLT   929
      IF(XP.LT.X(I)) GO TO 4                                             DATAPLT   930
    2 CONTINUE                                                           DATAPLT   931
      SPIFUN=Y(N)+D(N)*(XP-X(N))                                         DATAPLT   932
      RETURN                                                             DATAPLT   933
    4 C1=1./(X(I)-X(I-1))                                                DATAPLT   934
      C2=X(I)-XP                                                         DATAPLT   935
      C3=XP-X(I-1)                                                       DATAPLT   936
      C4=C2*C1                                                           DATAPLT   937
      C5=C3*C1                                                           DATAPLT   938
      SPIFUN=C5*C5*((1.+2.*C4)*Y(I)-C2*D(I))                             DATAPLT   939
     , +C4*C4*((1.+2.*C5)*Y(I-1)+C3*D(I-1))                              DATAPLT   940
      RETURN                                                             DATAPLT   941
    6 SPIFUN=Y(1)-D(1)*(X(1)-XP)                                         DATAPLT   942
      RETURN                                                             DATAPLT   943
       END                                                               DATAPLT   944


C/    LIST,NONE                                                          DATAPLT   945
      FUNCTION SPIDER(XP,N,X,Y,D)                                        DATAPLT   946
      DIMENSION X(1),Y(1),D(1)                                           DATAPLT   947
*  EVALUATES THE FIRST DERIVATIVE OF A NATURAL CUBIC SPLINE USING SLOPE   DATAPLT   948
*    ARRAY D CALCULATED BY SPISET AND USING THE INPUT DATA ARRAYS X AND   DATAPLT   949
      IF(XP.LE.X(1)) GO TO 6                                             DATAPLT   950
      DO 2 I=2,N                                                         DATAPLT   951
      IF(XP.LT.X(I)) GO TO 4                                             DATAPLT   952
    2 CONTINUE                                                           DATAPLT   953
      SPIDER=D(N)                                                        DATAPLT   954
      RETURN                                                             DATAPLT   955
    4 C1=1./(X(I)-X(I-1))                                                DATAPLT   956
      C2=X(I)-XP                                                         DATAPLT   957
      C3=XP-X(I-1)                                                       DATAPLT   958
      C4=2.*C2-C3                                                        DATAPLT   959
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```
      C5=2.*C3-C2                                                        DATAPLT    960
      SPIDER=C1*C1*(C3*(2.*(1.+C1*C4)*                                   DATAPLT    961
     , Y(I)-C4*D(I))-C2*(2.*(1.+C1*C5)*Y(I-1)+C5*D(I-1)))                DATAPLT    962
      RETURN                                                             DATAPLT    963
     6 SPIDER=D(1)                                                       DATAPLT    964
      RETURN                                                             DATAPLT    965
       END                                                               DATAPLT    966


C/    LIST,NONE                                                          DATAPLT    967
      SUBROUTINE SMOOTHC(N,X,Y,T)                                        DATAPLT    968
*  THE Y ARRAY IS SMOOTHED BY A LOCAL FIVE POINT LEAST SQUARES CUBIC     DATAPLT    969
*    WEIGHTED BY W                                                      DATAPLT    970
      DIMENSION X(1),Y(1),T(1)                                           DATAPLT    971
      IF(N.LT.5)RETURN                                                   DATAPLT    972
      S=(T*(X(N)-X(1))/N)**2                                             DATAPLT    973
      DO 4 L=1,N                                                         DATAPLT    974
      K=MIN0(N-4,MAX0(1,L-2))                                            DATAPLT    975
      K4=K+4                                                             DATAPLT    976
      DO 1 I=1,20                                                        DATAPLT    977
     1 T(I)=0.                                                           DATAPLT    978
      DO 3 M=K,K4                                                        DATAPLT    979
      W=1./(S+(X(L)-X(M))**2)                                            DATAPLT    980
      R=1.                                                               DATAPLT    981
      DO 3 I=1,4                                                         DATAPLT    982
      RR=1.                                                              DATAPLT    983
      DO 2 J=1,4                                                         DATAPLT    984
      T(I+J*4-4)=T(I+J*4-4)+R*RR*W                                       DATAPLT    985
     2 RR=RR*X(M)                                                        DATAPLT    986
      T(I+16)=T(I+16)+R*Y(M)*W                                           DATAPLT    987
     3 R=R*X(M)                                                          DATAPLT    988
      CALL CHLSKYS(T,4,T(17),1,4)                                        DATAPLT    989
      M=1+MOD(L-1,5)                                                     DATAPLT    990
      IF(L.GT.5) Y(L-5)=T(M+20)                                          DATAPLT    991
      T(M+20)=0.                                                         DATAPLT    992
      R=1.                                                               DATAPLT    993
      DO 4 J=1,4                                                         DATAPLT    994
      T(M+20)=T(M+20)+R*T(J+16)                                          DATAPLT    995
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```
      4 R=R*X(L)                                                        DATAPLT    996
        DO 5 L=1,5                                                      DATAPLT    997
        ML=1+MOD(M+L-1,5)                                               DATAPLT    998
      5 Y(N-5+L)=T(ML+20)                                               DATAPLT    999
        RETURN                                                          DATAPLT   1000
         END                                                            DATAPLT   1001


C/      LIST,NONE                                                       DATAPLT   1002
        SUBROUTINE CHLSKYS(A,N,B,M,NX)                                  DATAPLT   1003
        DIMENSION A(NX,1),B(NX,1)                                       DATAPLT   1004
*   CHOLESKY DECOMPOSITION IS USED TO SOLVE THE MATRIX EQUATION AX = B,  DATAPLT   1005
*     WHERE THE COEFFICIENT MATRIX, A, IS SYMMETRIC.  ON OUTPUT X IS    DATAPLT   1006
*     STORED IN B.                                                      DATAPLT   1007
        IF(N.EQ.1) GO TO 6                                              DATAPLT   1008
        DO 2 I=2,N                                                      DATAPLT   1009
        I1=I-1                                                          DATAPLT   1010
        DO 2 J=I,N                                                      DATAPLT   1011
        DO 2 L=1,I1                                                     DATAPLT   1012
      2 A(I,J)=A(I,J)-A(L,I)*A(L,J)/A(L,L)                              DATAPLT   1013
        DO 5 K=1,M                                                      DATAPLT   1014
        DO 3 I=2,N                                                      DATAPLT   1015
        I1=I-1                                                          DATAPLT   1016
        DO 3 L=1,I1                                                     DATAPLT   1017
      3 B(I,K)=B(I,K)-A(L,I)*B(L,K)/A(L,L)                              DATAPLT   1018
        DO 4 I=2,N                                                      DATAPLT   1019
        I1=I-1                                                          DATAPLT   1020
        DO 4 L=1,I1                                                     DATAPLT   1021
        NI=N-I1                                                         DATAPLT   1022
        NL=N+1-L                                                        DATAPLT   1023
      4 B(NI,K)=B(NI,K)-A(NI,NL)*B(NL,K)/A(NL,NL)                       DATAPLT   1024
        DO 5 I=1,N                                                      DATAPLT   1025
      5 B(I,K)=B(I,K)/A(I,I)                                            DATAPLT   1026
        RETURN                                                          DATAPLT   1027
      6 A(1,1)=1./A(1,1)                                                DATAPLT   1028
        DO 7 L=1,M                                                      DATAPLT   1029
```

APPENDIX B.- Continued

```
      7 B(1,L)=A(1,1)*B(1,L)                                          DATAPLT  1030
        RETURN                                                        DATAPLT  1031
         END                                                          DATAPLT  1032



C/      LIST,NONE                                                     DATAPLT  1033
        SUBROUTINE ARCALC(N,IFLAG)                                    DATAPLT  1034
*   ARCALC CALCULATES THE S(I) ARRAY OF APPROXIMATE ARC LENGTHS       DATAPLT  1035
        COMMON/ARCPAR/S(101)/SCALEX/X(101)/SCALEY/Y(101)              DATAPLT  1036
        R24=.0416666666666667                                         DATAPLT  1037
        S(1)=0                                                        DATAPLT  1038
        S(2)=B1=SQRT((X(2)-X(1))**2+(Y(2)-Y(1))**2)                   DATAPLT  1039
        IF(N.EQ.2) RETURN                                             DATAPLT  1040
        N1=N-1                                                        DATAPLT  1041
        HS=H1=0                                                       DATAPLT  1042
        IF(IFLAG.EQ.0) GO TO 1                                        DATAPLT  1043
        B2=SQRT((X(1)-X(N1))**2+(Y(1)-Y(N1))**2)                      DATAPLT  1044
        C1=SQRT((X(2)-X(N1))**2+(Y(2)-Y(N1))**2)                      DATAPLT  1045
        A1=(X(1)-X(N1))*(Y(2)-Y(N1))-(X(2)-X(N1))*(Y(1)-Y(N1))        DATAPLT  1046
        HS=H1=A1/(B2*B1*C1)                                           DATAPLT  1047
      1 DO 2 I=2,N1                                                   DATAPLT  1048
        IP=I+1                                                        DATAPLT  1049
        IN=I-1                                                        DATAPLT  1050
        B=SQRT((X(IP)-X(I))**2+(Y(IP)-Y(I))**2)                       DATAPLT  1051
        C=SQRT((X(IP)-X(IN))**2+(Y(IP)-Y(IN))**2)                     DATAPLT  1052
        A=(X(I)-X(IN))*(Y(IP)-Y(IN))-(X(IP)-X(IN))*(Y(I)-Y(IN))       DATAPLT  1053
        H=A/(B1*B*C)                                                  DATAPLT  1054
        S(I)=S(I-1)+B1*(1.+R24*((H1+H)*R1)**2)                        DATAPLT  1055
        B1=B                                                          DATAPLT  1056
        H1=H                                                          DATAPLT  1057
      2 CONTINUE                                                      DATAPLT  1058
        S(N)=S(N-1)+B1*(1.+R24*((H1+HS)*R1)**2)                       DATAPLT  1059
        RETURN                                                        DATAPLT  1060
         END                                                          DATAPLT  1061
```

```
C/    LIST,NONE                                                    DATAPLT  1062
      SUBROUTINE LIMPLT(X,Y,IPEN)                                  DATAPLT  1063
*  CAUSES PEN MOTION IF (X,Y) IS IN PREDECLARED FRAME              DATAPLT  1064
      DIMENSION X(1),Y(1)                                          DATAPLT  1065
      IPLM=IPEN                                                    DATAPLT  1066
      IF(X.GT.XX) GO TO 1                                          DATAPLT  1067
      IF(X.LT.XN) GO TO 1                                          DATAPLT  1068
      IF(Y.GT.YX) GO TO 1                                          DATAPLT  1069
      IF(Y.LT.YN) GO TO 1                                          DATAPLT  1070
      IF(IFLAG.EQ.1)IPLM=3                                         DATAPLT  1071
      CALL CALPLT(X,Y,IPLM)                                        DATAPLT  1072
      IFLAG=0                                                      DATAPLT  1073
      RETURN                                                       DATAPLT  1074
    1 IFLAG=1                                                      DATAPLT  1075
      RETURN                                                       DATAPLT  1076
                                                                   DATAPLT  1077
      ENTRY LIMSET                                                 DATAPLT  1078
*  ENTRY POINT LIMSET IS USED TO PASS FRAME LIMITS (INCHES)        DATAPLT  1079
      IFLAG=IPEN                                                   DATAPLT  1080
      XN=X                                                         DATAPLT  1081
      YN=Y                                                         DATAPLT  1082
      XX=X(2)                                                      DATAPLT  1083
      YX=Y(2)                                                      DATAPLT  1084
      RETURN                                                       DATAPLT  1085
      END                                                          DATAPLT  1086
```

APPENDIX C

SOURCE LISTING OF PROGRAM LOOK

```
      OVERLAY (SELECT,0,0)                                                SELECT      1
      PROGRAM SELECT (INPUT,OUTPUT,TAPE1,TAPE2)                           SELECT      2
      DIMENSION NAME(100),UNIT(100),DATA(100),NSAV(9),OUTNAM(9),          SELECT      3
     1 OUTUNT(9),OUT(40,9)                                                SELECT      4
      INTEGER QUANT,NAME,UNIT,OUTUNT,OUTNAM                               SELECT      5
      REWIND 1                                                            SELECT      6
      REWIND 2                                                            SELECT      7
      IRUN=99999                                                          SELECT      8
      WRITE (2,112)  IRUN                                                 SELECT      9
      WRITE 99                                                            SELECT     10
   99 FORMAT ( /1X,39HYOU ARE NOW EXECUTING PROGRAM "SELECT", /           SELECT     11
     1 1X,44HWHICH PREPARES PLOT DATA FROM A "SIFT" TAPE.  //             SELECT     12
     2 1X,41HIF YOU DO NOT NEED VALUES FROM THIS TAPE, /                  SELECT     13
     3 1X,35HSPECIFY 0 QUANTITIES TO TERMINATE.  //)                      SELECT     14
      DO 20  I=1,9                                                        SELECT     15
   20 NSAV(I)=0                                                           SELECT     16
      READ (1)  TYPE,NMAX,(NAME(I),I=1,NMAX)                              SELECT     17
      READ (1)  TYPE,NMAX,(UNIT(I),I=1,NMAX)                              SELECT     18
      WRITE 100                                                           SELECT     19
  100 FORMAT (1X,42HTHE FOLLOWING QUANTITIES ARE ON THIS TAPE:/)          SELECT     20
      WRITE 101, ((NAME(I),UNIT(I)),I=1,NMAX)                             SELECT     21
  101 FORMAT (3(1X,A10,2H (,A10,2H),))                                    SELECT     22
      WRITE 102                                                           SELECT     23
  102 FORMAT(/1X,36HHOW MANY OF THESE VALUES DO YOU WANT     )            SELECT     24
      READ 103, NWANT                                                     SELECT     25
  103 FORMAT (I1)                                                         SELECT     26
      IF (NWANT.EQ.0)  GO TO 999                                          SELECT     27
      WRITE 104                                                           SELECT     28
  104 FORMAT(/1X,48HNOW PLEASE NAME THESE QUANTITIES, ONE AT A TIME,/     SELECT     29
     1 1X,26HAND PUSH CR AFTER EACH ONE  )                                SELECT     30
      DO 1  I=1,NWANT                                                     SELECT     31
    3 READ 105, QUANT                                                     SELECT     32
  105 FORMAT (A10)                                                        SELECT     33
```

```
      IF (QUANT.EQ.10HNONE        ) GO TO 999                          SELECT     34
      DO 2  J=1,NMAX                                                   SELECT     35
      IF (QUANT.NE.NAME(J))  GO TO 2                                   SELECT     36
      NSAV(I)=J                                                        SELECT     37
      OUTNAM(I)=NAME(J)                                                SELECT     38
      OUTUNT(I)=UNIT(J)                                                SELECT     39
    2 CONTINUE                                                         SELECT     40
      IF (NSAV(I).EQ.0)  GO TO 4                                       SELECT     41
      GO TO 13                                                         SELECT     42
    4 WRITE 106, QUANT                                                 SELECT     43
  106 FORMAT (1X,13HTHE QUANTITY ,A10,18H CAN NOT BE FOUND./           SELECT     44
     1 1X,17HPLEASE TRY AGAIN.  )                                      SELECT     45
      GO TO 3                                                          SELECT     46
   13 IF (I.NE.NWANT)  WRITE 107                                       SELECT     47
  107 FORMAT (1X,4HNEXT)                                               SELECT     48
    1 CONTINUE                                                         SELECT     49
      DO 5  I=1,NMAX                                                   SELECT     50
      IF (NAME(I).NE.10HRUN         ) GO TO 5                          SELECT     51
      JRUN=I                                                           SELECT     52
    5 CONTINUE                                                         SELECT     53
      WRITE 140                                                        SELECT     54
  140 FORMAT (/1X,36HDO YOU WANT DATA FOR ALL OF THE RUNS  /           SELECT     55
     1 1X,34HCONTAINED ON THIS TEST'S DATA TAPE   )                    SELECT     56
      NNN=0                                                            SELECT     57
      READ 114, A                                                      SELECT     58
      IF (A.EQ.3HYES)  GO TO 150                                       SELECT     59
      WRITE 108                                                        SELECT     60
  108 FORMAT (1X,40HWHAT RUN NUMBER DO YOU WANT THE DATA FOR  /        SELECT     61
     1 1X,44HPLEASE TYPE RUN NUMBER WITH A DECIMAL POINT.  )           SELECT     62
    7 READ 109,  RUN                                                   SELECT     63
  109 FORMAT (F5.2)                                                    SELECT     64
      IF (RUN.EQ.0.)  GO TO 999                                        SELECT     65
      IRUN=IFIX(RUN)                                                   SELECT     66
      K=0                                                              SELECT     67
      WRITE 110,  (OUTNAM(I),I=1,NWANT)                                SELECT     68
      WRITE 111,  (OUTUNT(I),I=1,NWANT)                                SELECT     69
  110 FORMAT (1X,6H  RUN ,9(2X,A10))                                   SELECT     70
  111 FORMAT (7X,9(2X,A10))                                            SELECT     71
      DO 6  I=1,100000                                                 SELECT     72
      READ (1)  TYPE,NMAX,(DATA(M),M=1,NMAX)                           SELECT     73
```

```
      IF (EOF(1))  8,160                                                SELECT     74
  160 IF (TYPE.EQ.4HNAME)  GO TO 6                                      SELECT     75
      IF (TYPE.EQ.4HUNIT)  GO TO 6                                      SELECT     76
      IF (TYPE.EQ.4HEND )  GO TO 8                                      SELECT     77
      IF (TYPE.NE.4HDATA)  GO TO 6                                      SELECT     78
      IF (DATA(JRUN).NE.RUN)  GO TO 6                                   SELECT     79
      IF (DATA(JRUN).GE.99999.)  GO TO 6                                SELECT     80
      K=K+1                                                             SELECT     81
      DO 9  L=1,NWANT                                                   SELECT     82
      M=NSAV(L)                                                         SELECT     83
      OUT(K,L)=DATA(M)                                                  SELECT     84
    9 CONTINUE                                                          SELECT     85
      WRITE 112,  IRUN,(OUT(K,L),L=1,NWANT)                             SELECT     86
    6 CONTINUE                                                          SELECT     87
    8 NPTS=K                                                            SELECT     88
      REWIND 1                                                          SELECT     89
  112 FORMAT (I5,9(E12.5))                                              SELECT     90
      IF (K.GT.0)  GO TO 30                                             SELECT     91
      WRITE 118,  IRUN                                                  SELECT     92
  118 FORMAT (1X,4HRUN ,I5,11H NOT FOUND,/                              SELECT     93
     1 1X,17HPLEASE TRY AGAIN.  )                                       SELECT     94
      GO TO 7                                                           SELECT     95
   30 WRITE 113,  NPTS,IRUN                                             SELECT     96
  113 FORMAT (1X,6HTHESE ,I5,28H POINTS ARE THE DATA FOR RUN,I5)        SELECT     97
      WRITE 121                                                         SELECT     98
  121 FORMAT(/1X,35HDO YOU NEED TO ALTER THE RUN NUMBER )               SELECT     99
      READ 114, A                                                       SELECT    100
      IF (A.EQ.3HNO )  GO TO 41                                         SELECT    101
   40 IRUN=IRUN+1000                                                    SELECT    102
      WRITE 122,  IRUN                                                  SELECT    103
  122 FORMAT (1X,21HTHE NEW RUN NUMBER IS ,I5/                          SELECT    104
     1 1X,20HIS THAT SATISFACTORY  )                                    SELECT    105
      READ 114, A                                                       SELECT    106
      IF (A.EQ.3HNO )  GO TO 40                                         SELECT    107
   41 WRITE 123                                                         SELECT    108
  123 FORMAT (1X,28HDO YOU WISH TO SAVE THE DATA )                      SELECT    109
      READ 114,  A                                                      SELECT    110
  114 FORMAT(A3)                                                        SELECT    111
      IF (A.EQ.3HNO )  GO TO 12                                         SELECT    112
      DO 10  I=1,NPTS                                                   SELECT    113
```

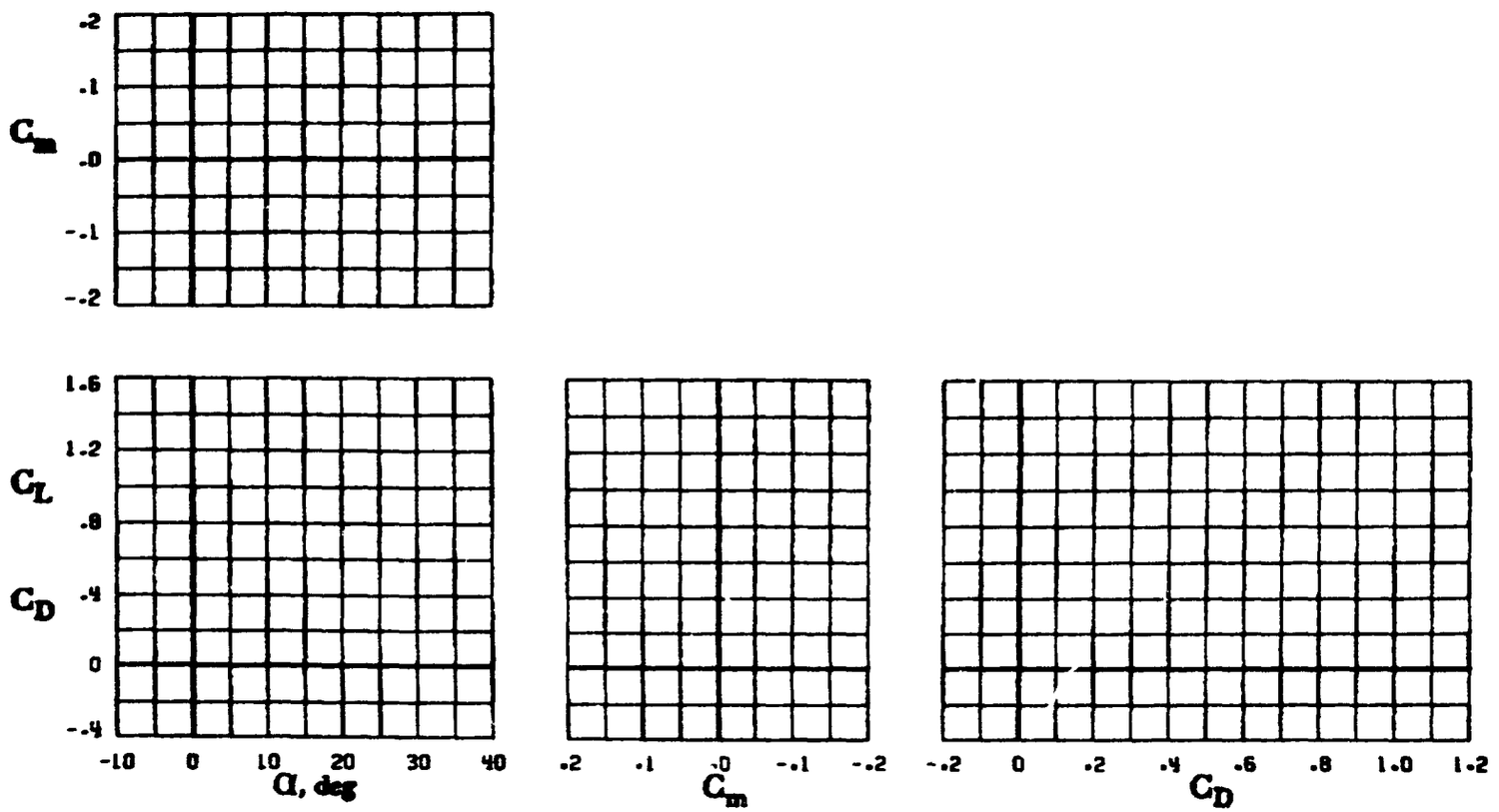
```
      WRITE (2,112)  IRUN,(OUT(I,L),L=1,NWANT)                          SELECT     114
   10 CONTINUE                                                          SELECT     115
   12 WRITE 115                                                         SELECT     116
  115 FORMAT (1X,26HWOULD YOU LIKE ANOTHER RUN    )                     SELECT     117
      READ  114, A                                                      SELECT     118
      IF (A.EQ.3HNO )  GO TO 11                                         SELECT     119
      WRITE 116                                                         SELECT     120
  116 FORMAT (1X,22HNEXT RUN NUMBER PLEASE    )                         SELECT     121
      GO TO 7                                                           SELECT     122
   11 GO TO 158                                                         SELECT     123
  150 WRITE 121                                                         SELECT     124
      READ 114, A                                                       SELECT     125
      IF (A.EQ.3HNO )  GO TO 151                                        SELECT     126
      WRITE 152                                                         SELECT     127
  152 FORMAT (/1X,39HHOW MANY 1000'S SHOULD BE ADDED TO THE  /          SELECT     128
     1 1X,11HRUN NUMBERS    )                                          SELECT     129
      READ 103,  NNN                                                    SELECT     130
  151 DO 156  I=1,100000                                                SELECT     131
      READ (1)  TYPE,NMAX,(DATA(M),M=1,NMAX)                            SELECT     132
      IF (EOF(1))  158,161                                              SELECT     133
  161 IF (TYPE.EQ.4HNAME)  GO TO 156                                    SELECT     134
      IF (TYPE.EQ.4HUNIT)  GO TO 156                                    SELECT     135
      IF (TYPE.EQ.4HEND )  GO TO 158                                    SELECT     136
      IF (TYPE.NE.4HDATA)  GO TO 156                                    SELECT     137
      IF (DATA(JRUN).GE.99999.)  GO TO 156                              SELECT     138
      DO 159  L=1,NWANT                                                 SELECT     139
      M=NSAV(L)                                                         SELECT     140
      OUT(L)=DATA(M)                                                    SELECT     141
  159 CONTINUE                                                          SELECT     142
      IRUN=NNN*1000+IFIX(DATA(JRUN))                                    SELECT     143
      WRITE (2,112)  IRUN,(OUT(L),L=1,NWANT)                            SELECT     144
  156 CONTINUE                                                          SELECT     145
  158 WRITE 117                                                         SELECT     146
  117 FORMAT (1X,35HTHE DATA TAPE IS COMPLETE ON TAPE 2    )            SELECT     147
      REWIND 1                                                          SELECT     148
      REWIND 2                                                          SELECT     149
  999 STOP                                                              SELECT     150
      END                                                               SELECT     151
```

```
TESTPLT.
GET,TAPE1=FST369/UN=397868N.
GET,SELECT/UN=397868N.
SELECT.
REPLACE,TAPE2=H1344.
RETURN,TAPE1,TAPE2,H1344.
GET,TAPE1=FST402/UN=397868N.
SELECT.
GET,H1344.
REWIND,TAPE2.
COPYBF,H1344,TAPE3.
COPYBF,TAPE2,TAPE3.
REWIND,TAPE3.
PACK,TAPE3.
REPLACE,TAPE3=H1344.
RETURN,TAPE1,TAPE2,TAPE3,H1344.
GET,TAPE1=VSTL158/UN=397868N.
SELECT.
GET,H1344.
REWIND,TAPE2.
COPYBF,H1344,TAPE3.
COPYBF,TAPE2,TAPE3.
PACK,TAPE3.
REPLACE,TAPE3=H1344.
RETURN,SELECT,TAPE1,TAPE2,TAPE3,H1344.
GET,TAPE1=H1344.
GET,DATAPLT/UN=397868N.
DATAPLT.
REPLACE,SAVPLT=H1222.
RETURN,DATAPLT.
GET,LOOK.
LOOK.
GET,PLOTJOB.
SUBMIT,PLOTJOB,B.
DAYFILE.
EXIT.
DAYFILE.
```

Figure 1.- Procedure file TESTPLT.

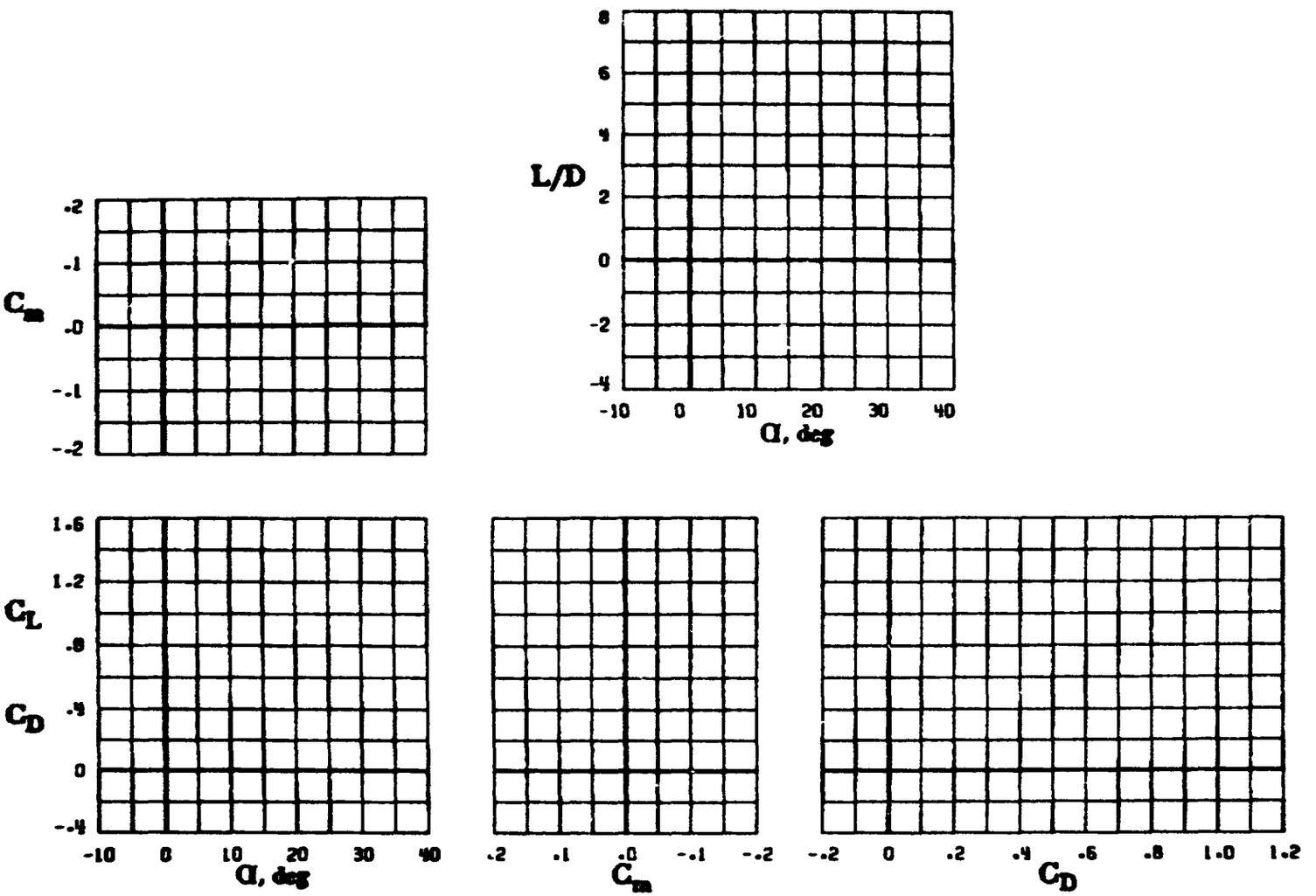
```
SHORT.
CLEAR.
GET,TAPE1=H1344.
GET,DATAPLT/UN=397868N.
DATAPLT.
REPLACE,SAVPLT=H1222.
RETURN,DATAPLT.
GET,LOOK.
LOOK.
GET,PLOTJOB.
SUBMIT,PLOTJOB,B.
DAYFILE.
EXIT.
DAYFILE.
```

Figure 2.- Procedure file SHORT



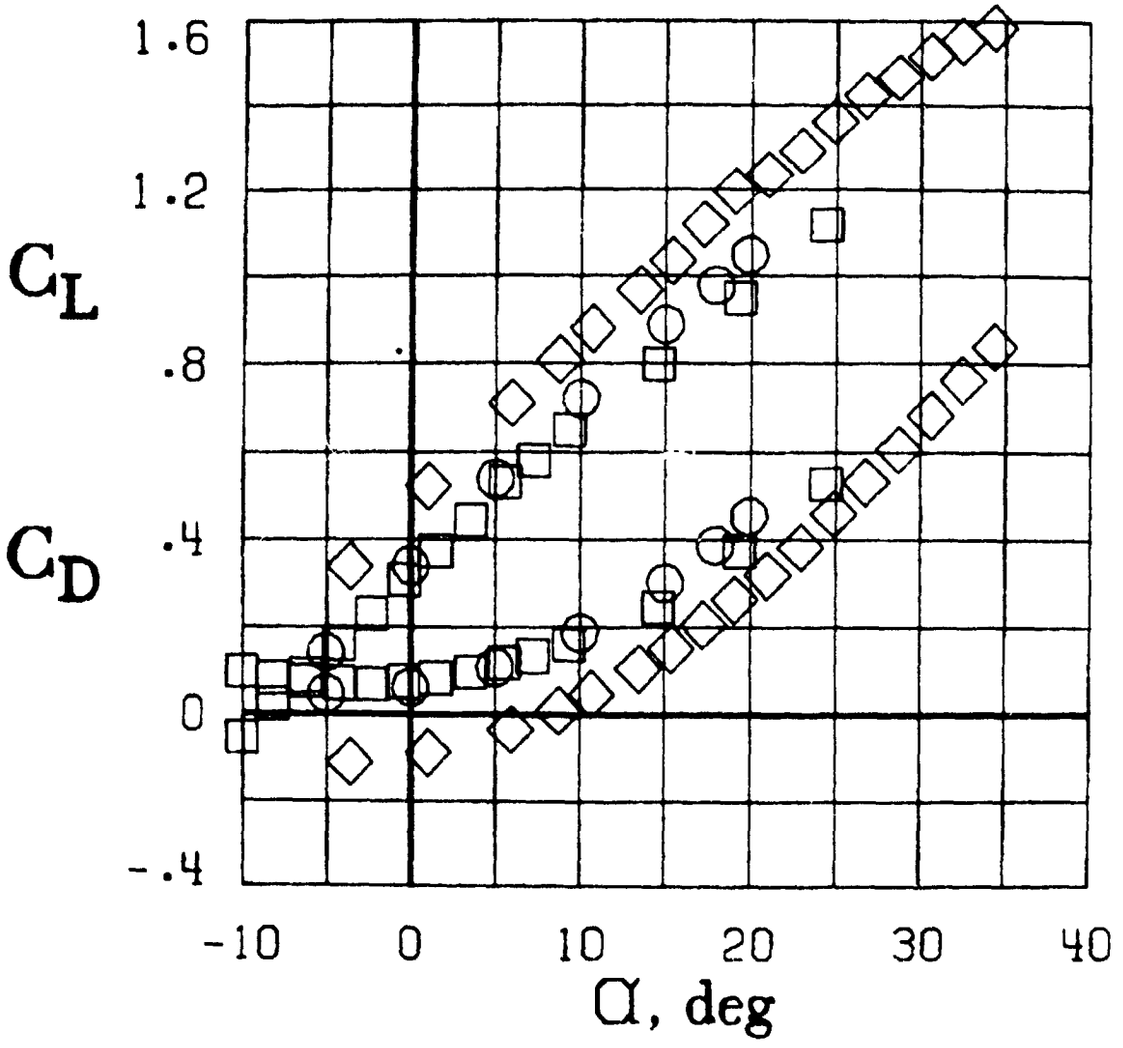
(a) Without optional L/D plot.

Figure 3.- Graphic formats available using program DATAPLT.



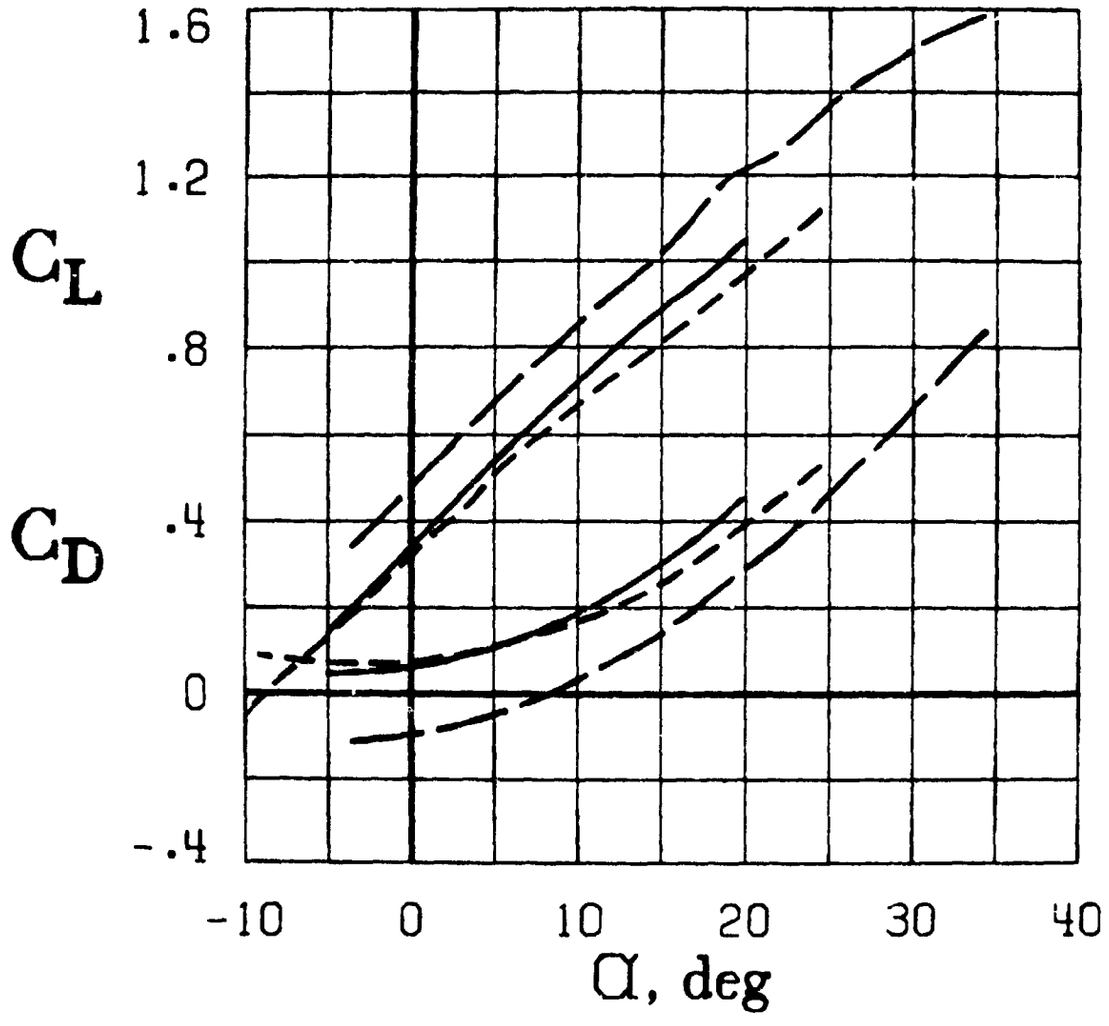
(b) With optional L/D plot.

Figure 3.- Concluded



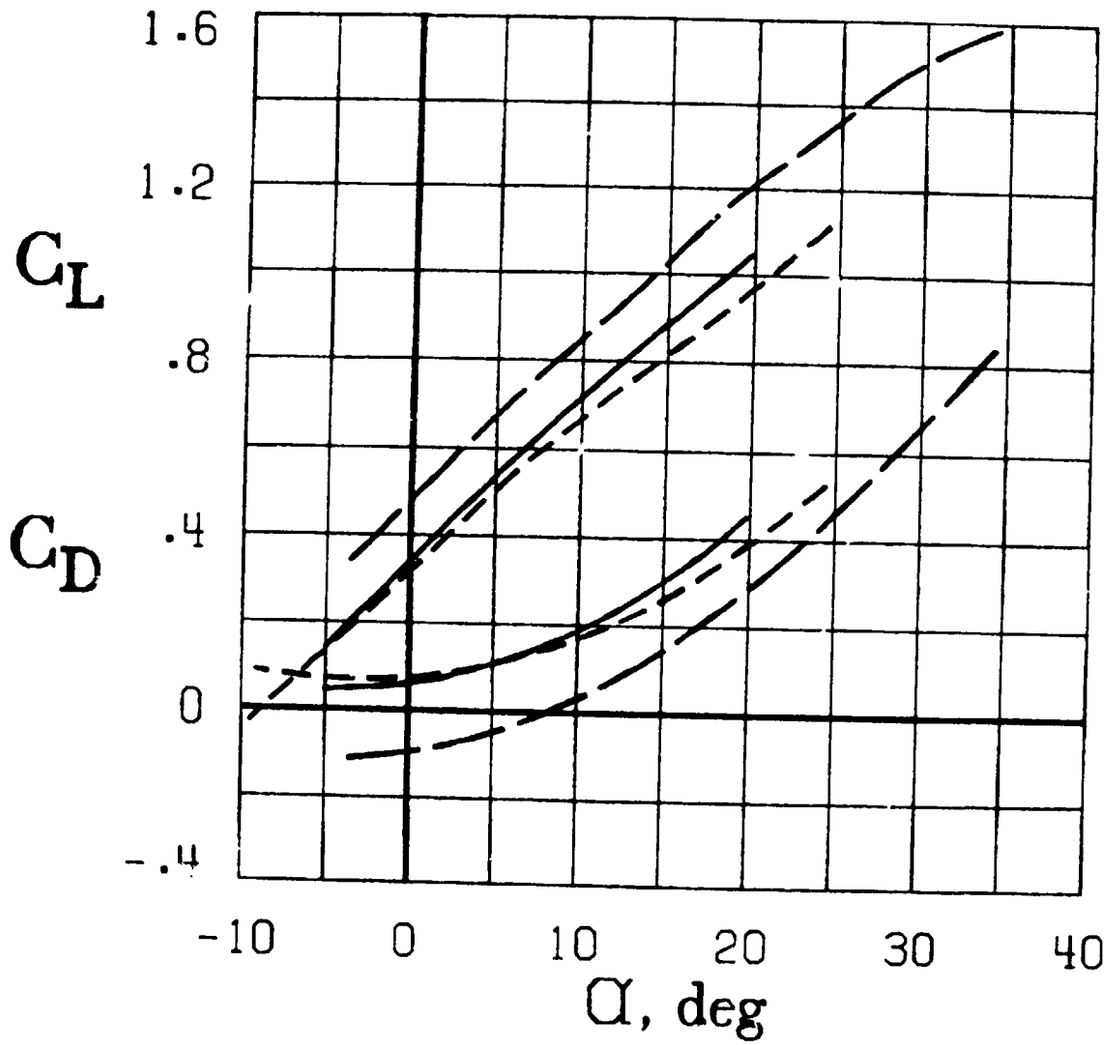
(a) Symbols only.

Figure 4.- Data representation available using program DATAPLT.



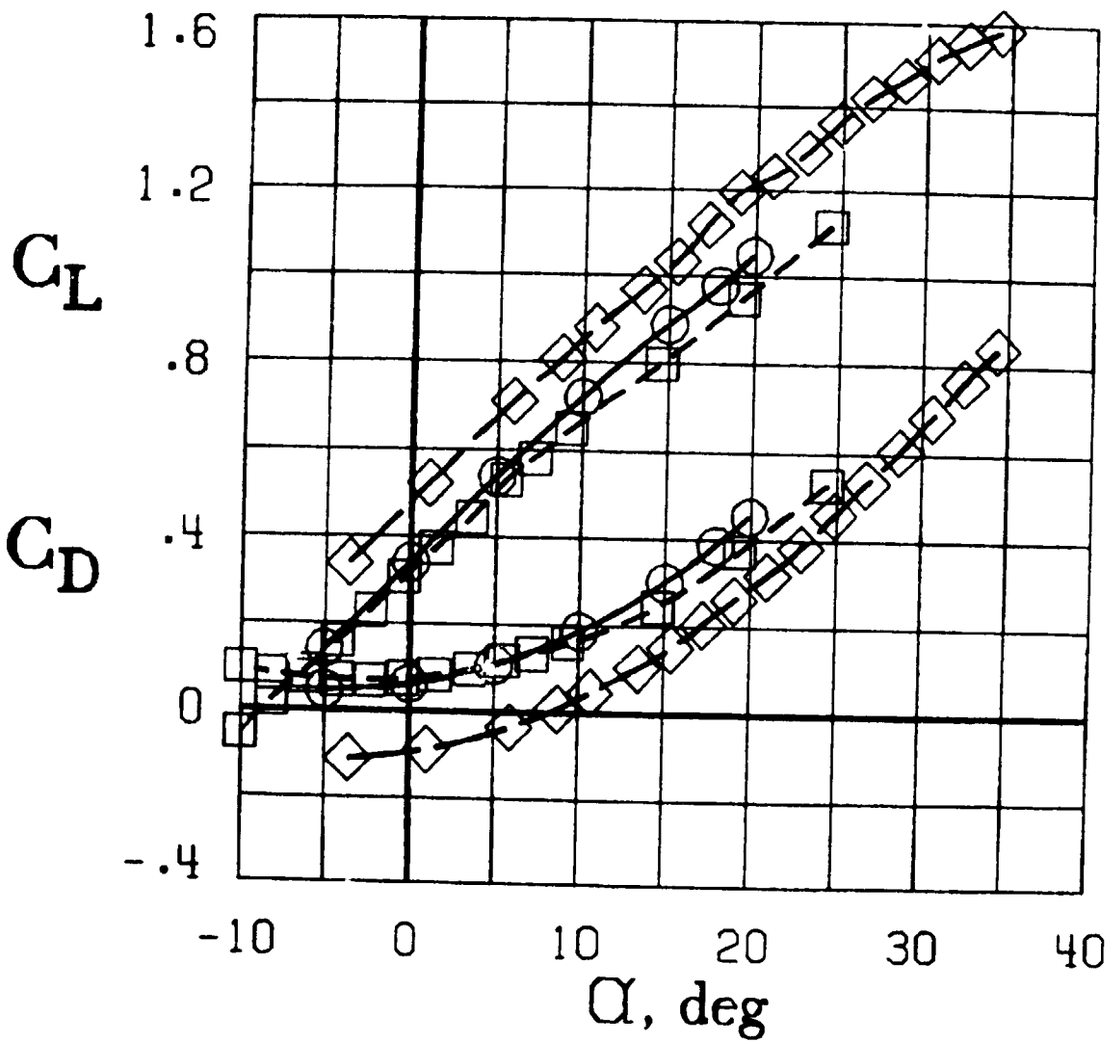
(b) Lines only, without smoothing.

Figure 4.- Continued.



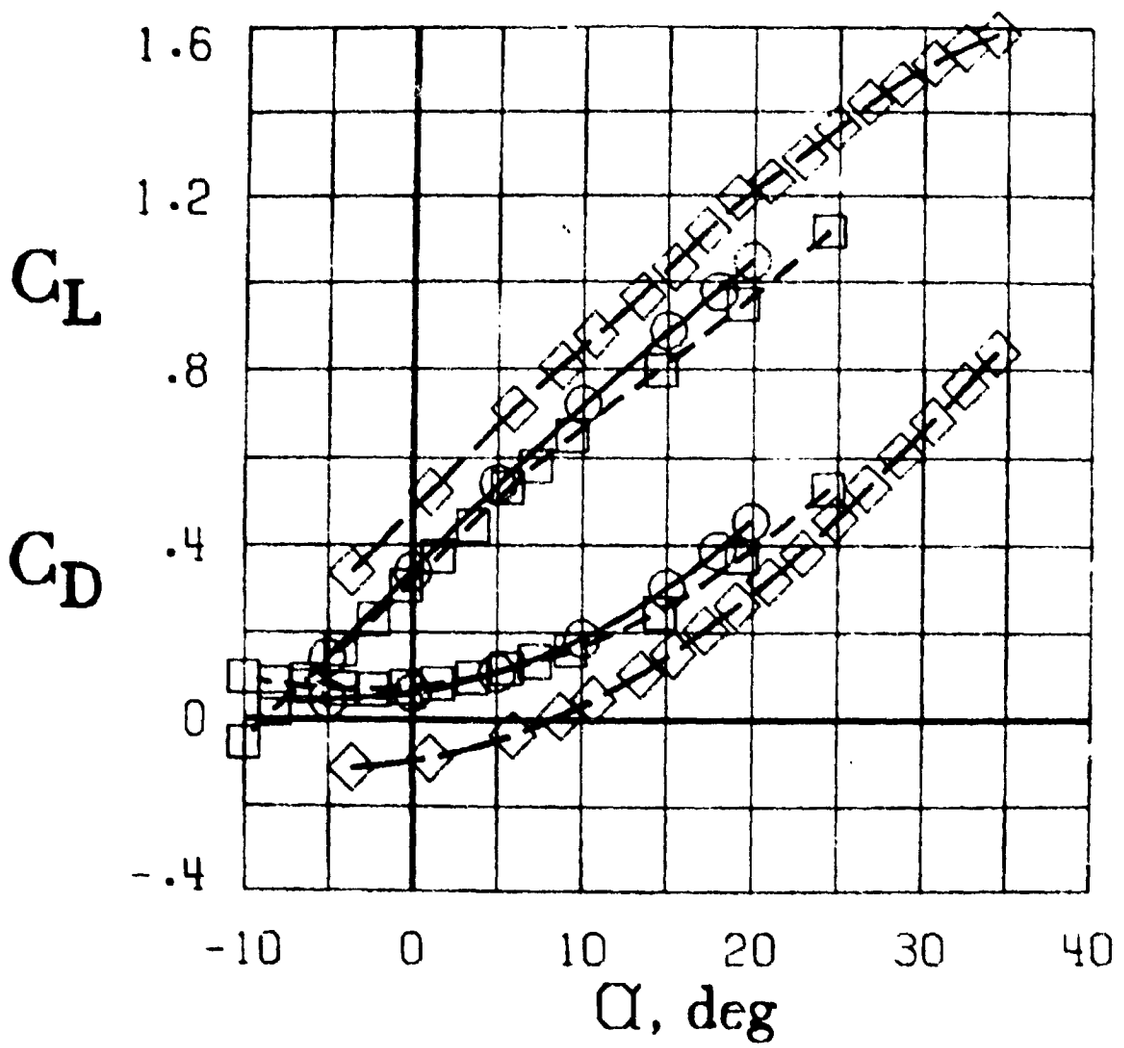
(c) Lines only, with smoothing.

Figure 4.- Continued.



(d) Lines and symbols, without smoothing.

Figure 4.- Continued.



(e) Lines and symbols, with smoothing.

Figure 4.- Concluded.

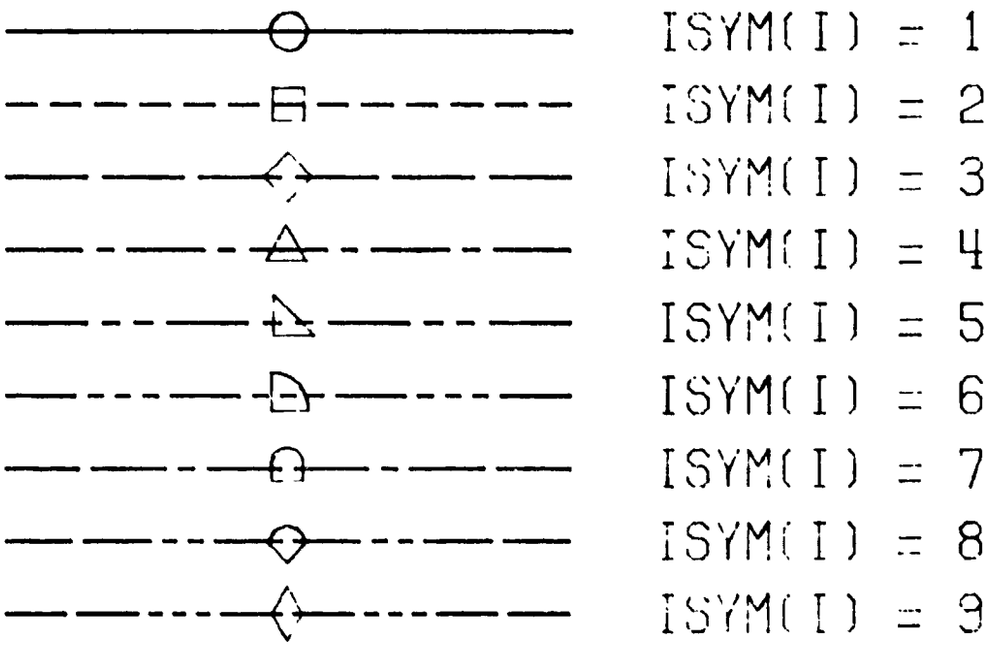


Figure 5.- Line and symbol characters available using program DATAPLT.

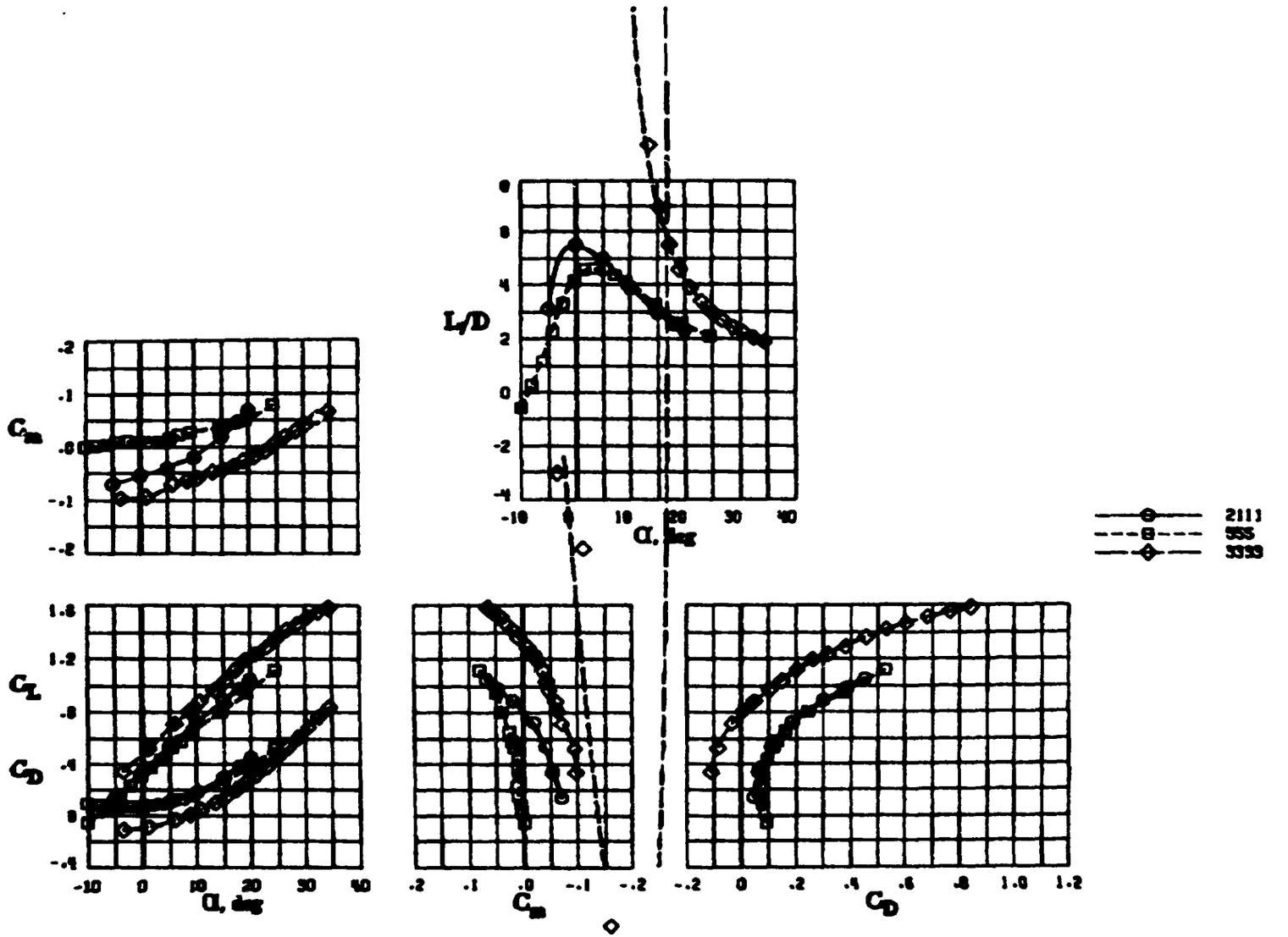
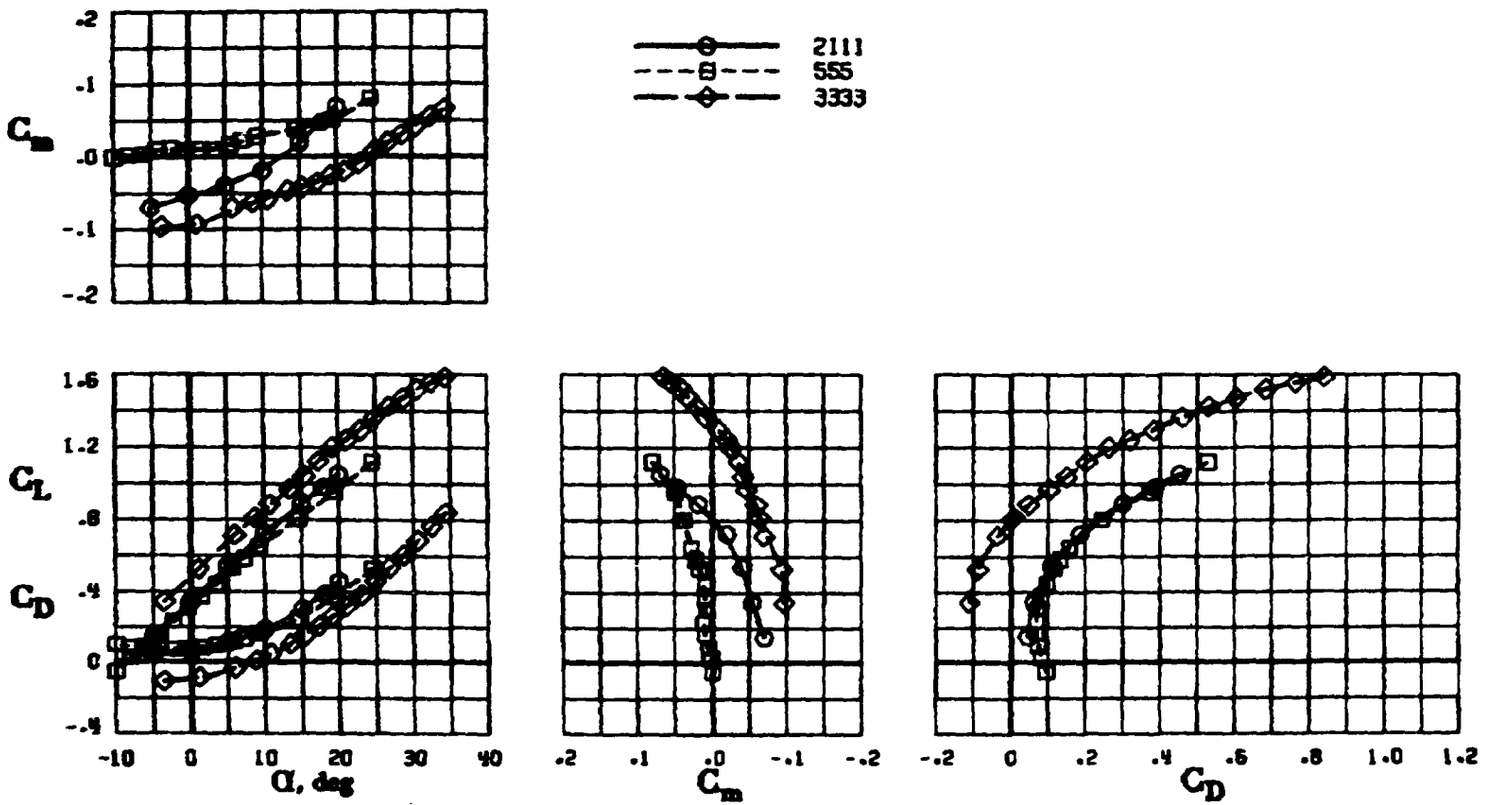
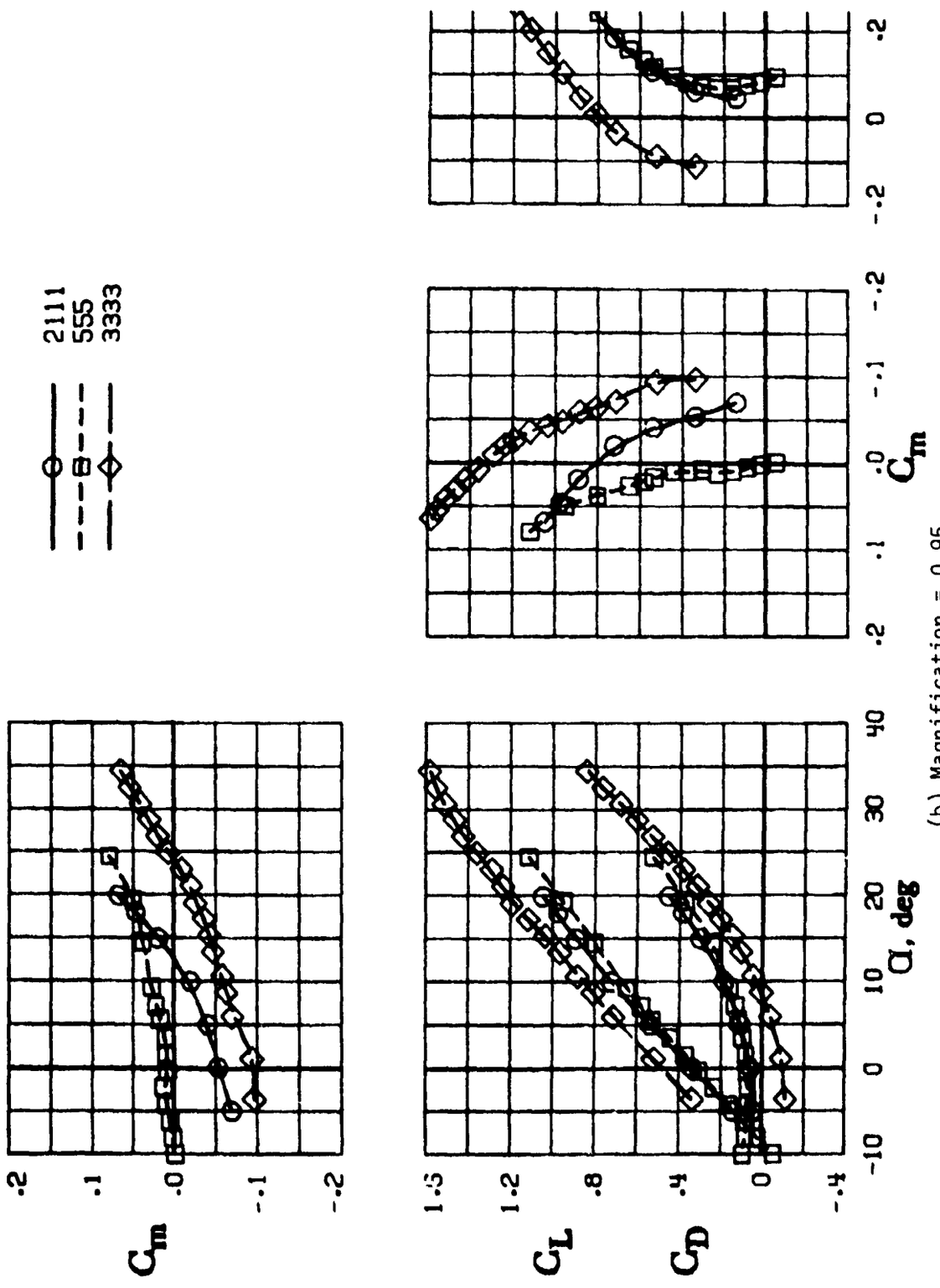


Figure 6.- Example of poorly conditioned plot obtained when L/D plot is used in conjunction with powered-lift data.



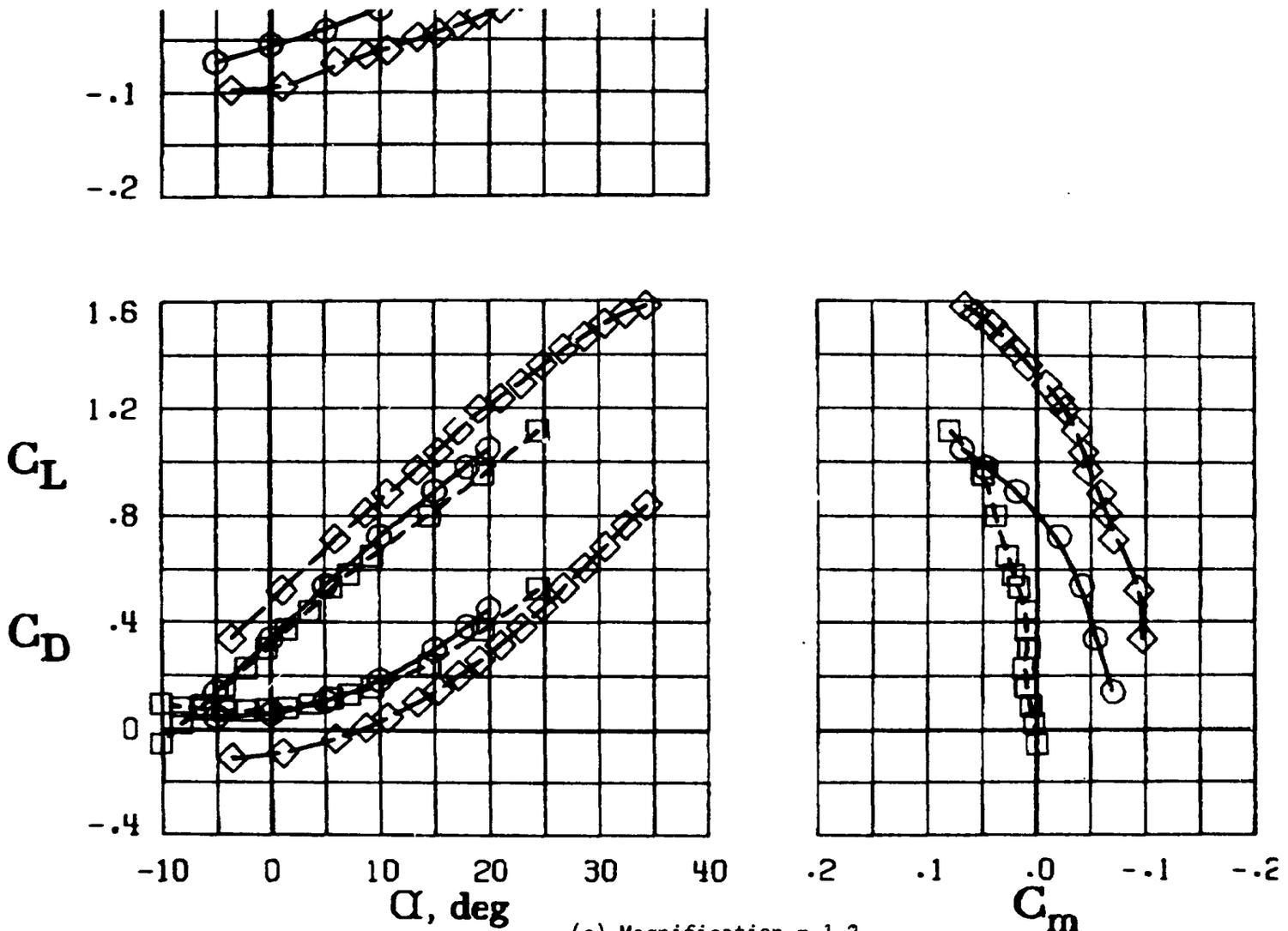
(a) Magnification = 0.7.

Figure 7.- Examples of the use of magnification in program LOOK to enlarge portions of a figure on the interactive graphic terminal display.



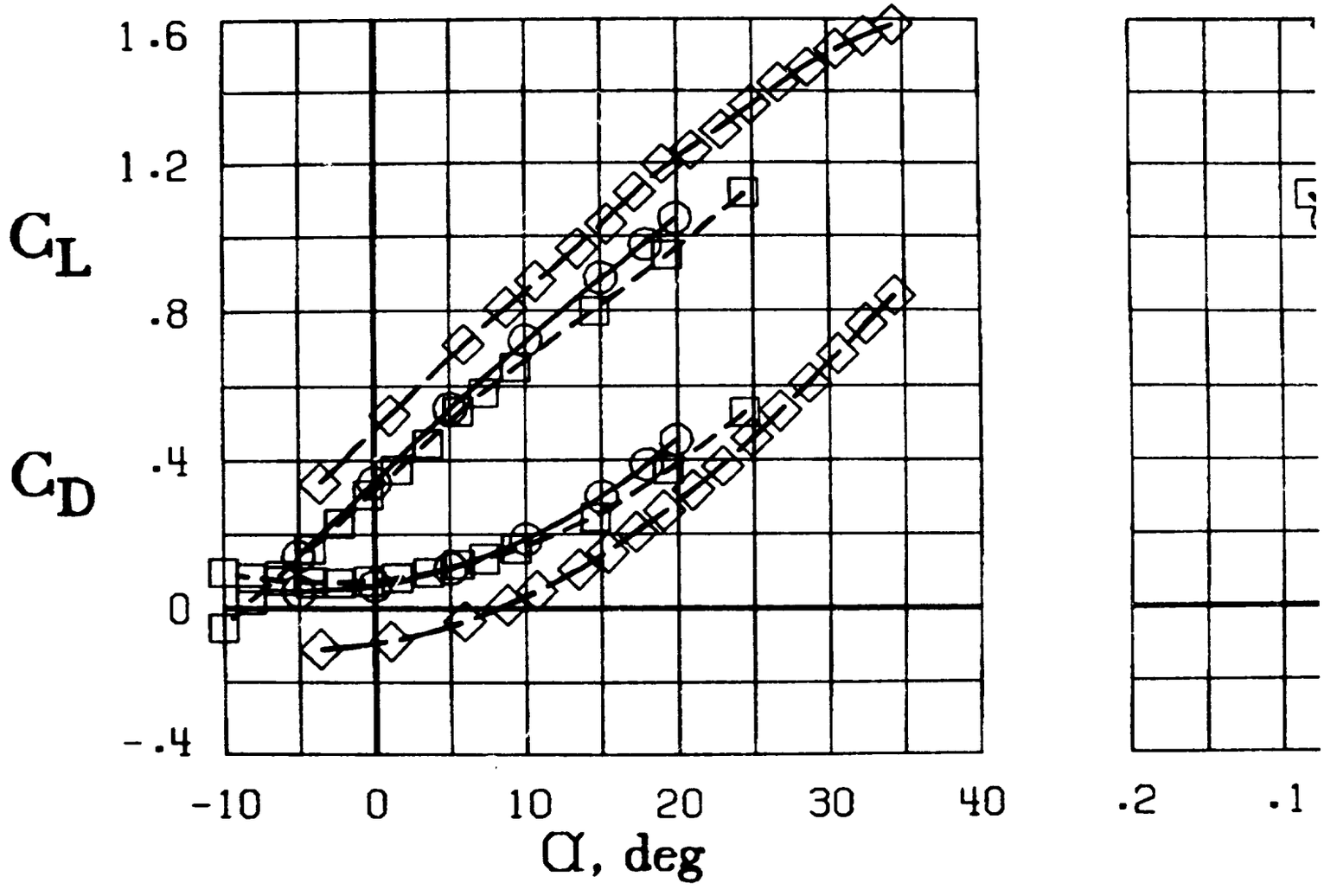
(b) Magnification = 0.95.

Figure 7.- Continued.



(c) Magnification = 1.2.

Figure 7.- Continued.



(d) Magnification = 1.6.

Figure 7.- Concluded.

```
/JOB
PLOTTS,T0030,CM070000.                          B??????   YOUR NAME
USER,??????N.
CHARGE,??????,LRC.
DELIVER.B?????   YOUR NAME
ATTACH,PLOT/UN=LIBRARY.
GET,SAVPLT=H1222.
PLOT.VARIAN
PLOT.CALPOST,30(XO=5.0,YO=3.0,XM=1.0,YM=1.0)
CONT. //02-PAPER, 0.3-MM BLACK LEROY PEN
CONT.  MULTIPLE MODE //
EXIT.
/EOR
/EOF
```

Figure 8.- Sample submittal file PLOTJOB

```
GET,TESTPLT/UN=397868N

READY.
CALL,TESTPLT


 YOU ARE NOW EXECUTING PROGRAM 'SELECT',
 WHICH PREPARES PLOT DATA FROM A 'SIFT' TAPE.

 IF YOU DO NOT NEED VALUES FROM THIS TAPE,
 SPECIFY 0 QUANTITIES TO TERMINATE.


 THE FOLLOWING QUANTITIES ARE ON THIS TAPE:

 ALPHA      (DEG        ), U          (FPS        ), Q          (PSF        ),
 POINT      (           ), DATE       (           ), TEST       (TEST 369   ),
 RUN        (           ), DELTA E    (DEG        ), T WET      (DEG F      ),
 DELTA F    (DEG        ), C MU       (           ), TC         (           ),
 RHO        (SLUG/CU FT ), BETA       (DEG        ), CONFIG     (CODE       ),
 T DRY      (DEG F      ), CL         (           ), CY         (           ),
 CM         (           ), CN         (           ), CROLL      (           ),
 CD         (           ), CZ BODY    (           ), CY BODY    (           ),
 CM BODY    (           ), CN BODY    (           ), CROLL BODY (           ),
 CX BODY    (           ), CL STAB    (           ), CY STAB    (           ),
 CM STAB    (           ), CN STAB    (           ), CROLL STAB (           ),
 CD STAB    (           ), RPM NO 1   (REV/MIN    ), RPM NO 2   (REV/MIN    ),
 RPM NO 3   (REV/MIN    ), RPM NO 4   (REV/MIN    ), FACILITY   (30X60 FST  ),

 HOW MANY OF THESE VALUES DO YOU WANT
? 4
```

(a) Commence executing TESTPLT and initial display from SELECT operation on first SIFT file.

Figure 9.- Display presentation during execution of procedure file TESTPLT.

```
 NOW PLEASE NAME THESE QUANTITIES, ONE AT A TIME,
 AND PUSH CR AFTER EACH ONE
? ALPHA
 NEXT
? CL
 NEXT
? CD
 NEXT
? CM

 DO YOU WANT DATA FOR ALL OF THE RUNS
 CONTAINED ON THIS TEST'S DATA TAPE
? YES

 DO YOU NEED TO ALTER THE RUN NUMBER
? YES

 HOW MANY 1000'S SHOULD BE ADDED TO THE
 RUN NUMBERS
? 3
 THE DATA TAPE IS COMPLETE ON TAPE 2
```

(b) Completion of SELECT operations on first SIFT file.

Figure 9.- Continued.

```
YOU ARE NOW EXECUTING PROGRAM 'SELECT',
WHICH PREPARES PLOT DATA FROM A 'SIFT' TAPE.

IF YOU DO NOT NEED VALUES FROM THIS TAPE,
SPECIFY 0 QUANTITIES TO TERMINATE.


THE FOLLOWING QUANTITIES ARE ON THIS TAPE:

ALPHA      (DEG        ), V          (FPS        ), Q          (PSF        ),
POINT      (           ), DATE       (           ), TEST       (TEST 402   ),
RUN        (           ), DELTA E    (DEG        ), T WET      (DEG F      ),
DELTA F    (DEG        ), C MU       (           ), TC         (           ),
RHO        (SLUG/CU FT), T DRY      (DEG F      ), BETA       (DEG        ),
CONFIG     (CODE       ), CL         (           ), CY         (           ),
CM         (           ), CN         (           ), CROLL      (           ),
CD         (           ), CZ BODY    (           ), CY BODY    (           ),
CM BODY    (           ), CN BODY    (           ), CROLL BODY (           ),
CX BODY    (           ), CL STAB    (           ), CY STAB    (           ),
CM STAB    (           ), CN STAB    (           ), CROLL STAB (           ),
CD STAB    (           ), FACILITY   (30X60 FST ),

 HOW MANY OF THESE VALUES DO YOU WANT
? 4

 NOW PLEASE NAME THESE QUANTITIES, ONE AT A TIME,
 AND PUSH CR AFTER EACH ONE
? ALPHA
 NEXT
? CL
 NEXT
? CD
 NEXT
? CM
```

(c) Initial display from SELECT operation on second SIFT file.

Figure 9.- Continued.

```
 DO YOU WANT DATA FOR ALL OF THE RUNS
 CONTAINED ON THIS TEST'S DATA TAPE
? NO
 WHAT RUN NUMBER DO YOU WANT THE DATA FOR
 PLEASE TYPE RUN NUMBER WITH A DECIMAL POINT.
? 555.
   RUN    ALPHA        CL           CD           CM
          DEG
  555 -.10047E+02 -.55321E-01   .94683E-01 -.10479E-02
  555 -.81915E+01   .22980E-01   .82528E-01   .22478E-02
  555 -.62054E+01   .87352E-01   .75219E-01   .47709E-02
  555 -.42436E+01   .15798E+00   .70062E-01   .99103E-02
  555 -.23023E+01   .23069E+00   .69657E-01   .12126E-01
  555 -.35951E+00   .30500E+00   .73307E-01   .80701E-02
  555  .14943E+01   .37281E+00   .81665E-01   .97686E-02
  555  .35176E+01   .44201E+00   .95912E-01   .10185E-01
  555  .55807E+01   .53118E+00   .11639E+00   .16644E-01
  555  .71907E+01   .58003E+00   .13294E+00   .21919E-01
  555  .93234E+01   .64934E+00   .15771E+00   .27087E-01
  555  .14550E+02   .79967E+00   .24412E+00   .37928E-01
  555  .19388E+02   .95097E+00   .37238E+00   .49815E-01
  555  .24480E+02   .11167E+01   .52728E+00   .79526E-01
 THESE    14 POINTS ARE THE DATA FOR RUN  555

 DO YOU NEED TO ALTER THE RUN NUMBER
? NO
 DO YOU WISH TO SAVE THE DATA
? YES
 WOULD YOU LIKE ANOTHER RUN
? NO
 THE DATA TAPE IS COMPLETE ON TAPE 2
```

(d) Completion of SELECT operation on second SIFT file.

Figure 9.- Continued.

```
YOU ARE NOW EXECUTING PROGRAM 'SELECT',
WHICH PREPARES PLOT DATA FROM A 'SIFT' TAPE.

IF YOU DO NOT NEED VALUES FROM THIS TAPE,
SPECIFY 0 QUANTITIES TO TERMINATE.


THE FOLLOWING QUANTITIES ARE ON THIS TAPE:

RUN          (            ), POINT       (            ), TEST        (TEST 158    ),
MACH NO      (            ), Q           (PSF         ), BETA        (DEG         ),
ALPHA        (DEG         ), CZ BODY     (            ), CA BODY     (            ),
CM BODY      (            ), CROLL BODY  (            ), CN BODY     (            ),
CY BODY      (            ), CL STAB     (            ), CD STAB     (            ),
CM STAB      (            ), CROLL STAB  (            ), CN STAB     (            ),
CY STAB      (            ), L/D         (            ), NORMAL F    (LB          ),
AXIAL F      (LB          ), PITCH M     (IN-LB       ), ROLL M      (IN-LB       ),
YAW M        (IN-LB       ), SIDE F      (LB          ), LIFT        (LB          ),
DRAG         (LB          ), RPM 1       (REV/MIN     ), RPM 2       (REV/MIN     ),
RPM 3        (REV/MIN     ), RPM 4       (REV/MIN     ), P TOT 1     (PSF         ),
P TOT 2      (PSF         ), P TOT 3     (PSF         ), P TOT 4     (PSF         ),
P TOT TOT    (PSF         ), CT          (            ), Q EXIT 1    (PSF         ),
Q EXIT 2     (PSF         ), Q EXIT 3    (PSF         ), Q EXIT 4    (PSF         ),
Q EXIT 5     (PSF         ), Q EXIT 6    (PSF         ), Q EXIT 7    (PSF         ),
Q EXIT 8     (PSF         ), P STING     (PSF         ), RESULT F 2  (LB (N+A)    ),
RESULT F 3   (LB (N+A+S)  ), RHO         (SLUG/CU FT  ), FACILITY    (V/STOL TUN  ),

HOW MANY OF THESE VALUES DO YOU WANT
? 4
```

(e) Start of SELECT operations on third SIFT files.

Figure 9.- Continued.

```
 NOW PLEASE NAME THESE QUANTITIES, ONE AT A TIME,
 AND PUSH CR AFTER EACH ONE
? ALPHA
 NEXT
? CL
 THE QUANTITY CL          CAN NOT BE FOUND.
 PLEASE TRY AGAIN.
? CL STAB
 NEXT
? CD STAB
 NEXT
? CM STAB

 DO YOU WANT DATA FOR ALL OF THE RUNS
 CONTAINED ON THIS TEST'S DATA TAPE
? NO
 WHAT RUN NUMBER DO YOU WANT THE DATA FOR
 PLEASE TYPE RUN NUMBER WITH A DECIMAL POINT.
? 604.
   RUN    ALPHA        CL STAB      CD STAB      CM STAB
          DEG
 RUN    604 NOT FOUND,
 PLEASE TRY AGAIN.
? 111.
```

(f) Continuation of SELECT operations on third SIFT file.

Figure 9.- Continued.

```
  RUN    ALPHA        CL STAB      CD STAB      CM STAB
         DEG
  111 -.50322E+01   .14037E+00   .45283E-01 -.70194E-01
  111   .12550E-01   .33898E+00   .61472E-01 -.53701E-01
  111   .50047E+01   .53824E+00   .10750E+00 -.40929E-01
  111   .99783E+01   .72156E+00   .18552E+00 -.20167E-01
  111   .14981E+02   .88976E+00   .29985E+00  .18930E-01
  111   .179F6E+02   .97875E+00   .38612E+00  .46853E-01
  111   .19931E+02   .10492E+01   .45267E+00  .68181E-01
 THESE      7 POINTS ARE THE DATA FOR RUN  111

 DO YOU NEED TO ALTER THE RUN NUMBER
? YES
 THE NEW RUN NUMBER IS 1111
 IS THAT SATISFACTORY
? NO
 THE NEW RUN NUMBER IS 2111
 IS THAT SATISFACTORY
? YES
 DO YOU WISH TO SAVE THE DATA
? YES
 WOULD YOU LIKE ANOTHER RUN
? NO
 THE DATA TAPE IS COMPLETE ON TAPE 2
```

(g) Completion of SELECT operations on third SIFT file.

Figure 9.- Continued.

```
 YOU ARE NOW EXECUTING PROGRAM 'DATAPLT',
 WHICH PREPARES A LONGITUDINAL SAVPLT FILE.

 DO YOU WANT BOTH SYMBOLS AND LINES
? YES
 DO YOU WANT THE LINES SMOOTHED THROUGH THE DATA
? YES
 DO YOU WANT THE OPTIONAL L/D PLOT
? NO
 DO YOU WANT TO ALTER ANY PLOTTING PARAMETERS
? NO
 STATE FIRST RUN NO., USING A DECIMAL POINT.
? 2111.
 RUN  2111 HAS BEEN PLOTTED.
 ENTER NEXT RUN. (USE 0. TO END PLOTTING.)
? 555.
 RUN   555 HAS BEEN PLOTTED.
 ENTER NEXT RUN. (USE 0. TO END PLOTTING.)
? 3333.
 RUN  3333 HAS BEEN PLOTTED.
 ENTER NEXT RUN. (USE 0. TO END PLOTTING.)
? 0.

 SAVPLT TAPE IS COMPLETE.
```

```
 YOU ARE NOW EXECUTING PROGRAM 'LOOK',
 WHICH PLOTS A SAVPLT FILE ON THE TUBE.
 TO BYPASS PROGRAM, USE MAGNIFICATION=0.
 TO CONTINUE AFTER PLOT, PUSH CR.

 WHAT IS YOUR CURRENT BAUD RATE

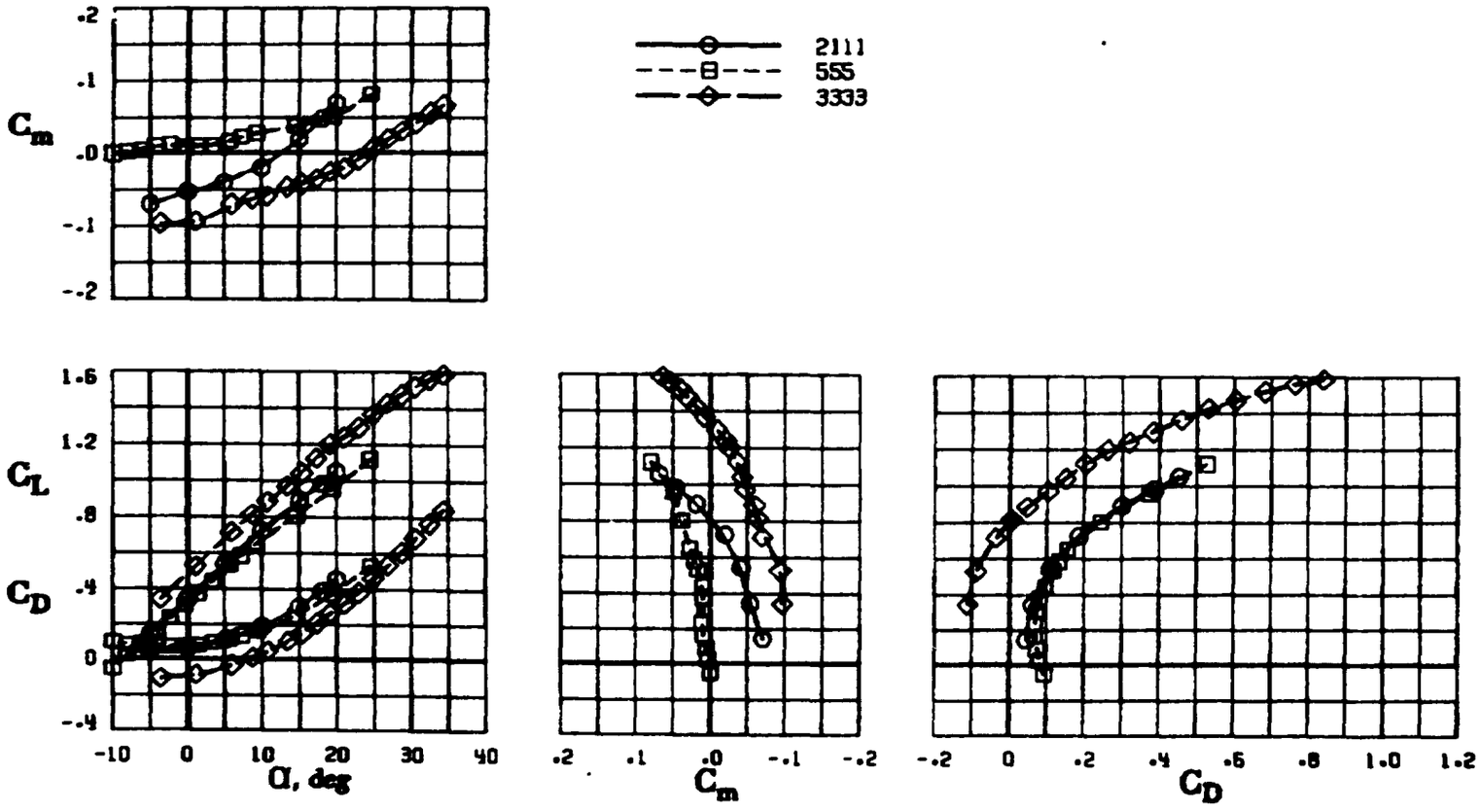
? 1200.


 NOW, WHAT MAGNIFICATION DO YOU WANT

? 0.7
```

(h) Messages during operation of programs DATAPLT and LOOK.

Figure 9.- Continued.



(i) Display of figure on graphics terminal.

Figure 9.- Continued.

```
11.52.57.$CHARGE,[redacted],LRC.
11.53.13.$CALL,TESTPLT.
11.53.15.GET,TAPE1=FST369/UN=397868N.
11.54.04.GET,SELECT/UN=397868N.
11.54.20.SELECT.
11.56.30.     STOP
11.56.30.      6.776 CP SECONDS EXECUTION TIME
11.56.30.REPLACE,TAPE2=H1344.
11.56.36.RETURN,TAPE1,TAPE2,H1344.
11.56.36.GET,TAPE1=FST402/UN=397868N.
11.57.01.SELECT.
12.00.11.     STOP
12.00.11.      3.190 CP SECONDS EXECUTION TIME
12.00.11.GET,H1344.
12.00.19.REWIND,TAPE2.
12.00.20.COPYBF,H1344,TAPE3.
12.00.24.  COPY COMPLETE.
12.00.25.COPYBF,TAPE2,TAPE3.
12.00.26.  COPY COMPLETE.
12.00.26.REWIND,TAPE3.
12.00.26.PACK,TAPE3.
12.00.47.  PACK COMPLETE.
12.00.48.REPLACE,TAPE3=H1344.
12.01.09.RETURN,TAPE1,TAPE2,TAPE3,H1344.
12.01.10.GET,TAPE1=VSTL158/UN=397868N.
12.03.05.SELECT.
12.07.02.     STOP
12.07.02.      3.480 CP SECONDS EXECUTION TIME
12.07.03.GET,H1344.
12.07.23.REWIND,TAPE2.
12.07.23.COPYBF,H1344,TAPE3.
12.07.30.  END OF INFORMATION ENCOUNTERED.
12.07.30.COPYBF,TAPE2,TAPE3.
12.07.31.  COPY COMPLETE.
12.07.32.PACK,TAPE3.
12.07.51.  PACK COMPLETE.
```

(j) First portion of dayfile.

Figure 9.- Continued.

```
12.07.51.REPLACE,TAPE3=H1344.
12.08.11.RETURN,SELECT,TAPE1,TAPE2,TAPE3,H1344.
12.08.12.GET,TAPE1=H1344.
12.08.34.GET,DATAPLT/UN=397868N.
12.08.54.DATAPLT.
12.13.28.     STOP
12.13.28.     17.390 CP SECONDS EXECUTION TIME
12.13.29.REPLACE,SAVPLT=H1222.
12.13.44.RETURN,DATAPLT.
12.13.44.GET,LOOK.
12.14.15.LOOK.
12.14.55.TT40, ASSIGNED TO TTPE16.
12.20.20.     STOP
12.20.20.      3.025 CP SECONDS EXECUTION TIME
12.20.21.GET,PLOTJOB.
12.20.21.SUBMIT,PLOTJOB,B.
12.20.26.AQGQAPI
12.20.28.DAYFILE.
12.20.48. USER DAYFILE DUMPED.
```

(h) Completion of dayfile.

Figure 9.- Concluded.

```
EDIT,H1344
 BEGIN TEXT EDITING.
? L,124
99999
 3230 -.10412E+02 -.27456E+00  .59809E-01  .17369E-01
 3230 -.55250E+01 -.72731E-01  .26200E-01  .16700E-01
 3230 -.89151E+00  .99553E-01  .15621E-01  .19424E-01
 3230  .42702E+01  .28252E+00  .29674E-01  .29490E-01
 3230  .61794E+01  .34745E+00  .43404E-01  .33594E-01
 3230  .80429E+01  .42710E+00  .64651E-01  .45398E-01
 3230  .10249E+02  .51467E+00  .96334E-01  .52188E-01
 3230  .12713E+02  .62127E+00  .14270E+00  .66345E-01
 3230  .14545E+02  .69395E+00  .18211E+00  .79109E-01
 3230  .16560E+02  .76731E+00  .22848E+00  .94973E-01
 3230  .18473E+02  .86583E+00  .29035E+00  .11685E+00
 3230  .20541E+02  .95064E+00  .35801E+00  .14095E+00
 3230  .22564E+02  .10241E+01  .42982E+00  .16297E+00
 3230  .24369E+02  .10868E+01  .49931E+00  .18326E+00
 3231 -.10350E+02 -.32887E+00 -.31456E-01  .30485E-01
 3231 -.55701E+01 -.10713E+00 -.68826E-01  .27829E-01
 3231 -.81906E+00  .87350E-01 -.77224E-01  .26566E-01
 3231  .42352E+01  .27891E+00 -.64176E-01  .33469E-01
 3231  .60845E+01  .35191E+00 -.49905E-01  .41076E-01
 3231  .80476E+01  .42282E+00 -.30698E-01  .46166E-01
 3231  .10266E+02  .52126E+00  .24724E-02  .57878E-01
 3231  .12683E+02  .63899E+00  .50341E-01  .71903E-01
 3231  .14612E+02  .71283E+00  .89571E-01  .80657E-01
 3231  .16532E+02  .79554E+00  .13886E+00  .98009E-01
 3231  .18432E+02  .88273E+00  .19504E+00  .11811E+00
 3231  .20659E+02  .97464E+00  .26656E+00  .14165E+00
 3231  .22504E+02  .10545E+01  .33495E+00  .16454E+00
 3231  .24435E+02  .11278E+01  .41170E+00  .18451E+00
 3232 -.10357E+02 -.36256E+00 -.13090E+00  .34977E-01
 3232 -.55584E+01 -.12107E+00 -.16854E+00  .33059E-01
 3232 -.87810E+00  .78560E-01 -.17831E+00  .35134E-01
 3232  .42215E+01  .28617E+00 -.16460E+00  .43455E-01
 3232  .61537E+01  .36893E+00 -.14726E+00  .48210E-01
 3232  .80500E+01  .43535E+00 -.12186E+00  .53375E-01
 3232  .10279E+02  .54431E+00 -.85781E-01  .65343E-01
 3232  .12664E+02  .64706E+00 -.41173E-01  .72663E-01
 3232  .14609E+02  .73644E+00  .35276E-02  .87510E-01
 3232  .16511E+02  .82403E+00  .52159E-01  .10431E+00
 3232  .18366E+02  .90538E+00  .10891E+00  .12914E+00
 3232  .20574E+02  .99952E+00  .17877E+00  .14480E+00
 3232  .22512E+02  .10782E+01  .24949E+00  .16494E+00
 3232  .24382E+02  .11609E+01  .32786E+00  .18892E+00
 3233 -.10221E+02 -.27060E+00  .65973E-01  .75052E-02
 3233 -.54285E+01 -.74846E-01  .30137E-01  .13958E-01
 3233 -.66756E+00  .11053E+00  .19307E-01  .19119E-01
 3233  .42930E+01  .26637E+00  .31879E-01  .27876E-01
 3233  .62524E+01  .35015E+00  .45175E-01  .35560E-01
 3233  .81672E+01  .41672E+00  .63144E-01  .40188E-01
 3233  .10398E+02  .50267E+00  .91479E-01  .45426E-01
 3233  .12365E+02  .59461E+00  .12961E+00  .48611E-01
 3233  .14804E+02  .66849E+00  .16549E+00  .54507E-01
 3233  .16616E+02  .73736E+00  .20437E+00  .65533E-01
 3233  .18609E+02  .81600E+00  .25636E+00  .81727E-01
 3233  .20725E+02  .88956E+00  .31406E+00  .92802E-01
 3233  .22727E+02  .96035E+00  .37775E+00  .10377E+00
 3233  .24608E+02  .10263E+01  .44515E+00  .11741E+00
 3234 -.10216E+02 -.32944E+00 -.31070E-01  .20073E-01
 3234 -.54854E+01 -.10305E+00 -.69476E-01  .20805E-01
 3234 -.75065E+00  .97911E-01 -.80182E-01  .26531E-01
 3234  .43539E+01  .27772E+00 -.67110E-01  .32856E-01
 3234  .63031E+01  .35501E+00 -.53583E-01  .39575E-01
 3234  .82188E+01  .41982E+00 -.35619E-01  .42532E-01
 3234  .10386E+02  .51372E+00 -.61893E-02  .46853E-01
 3234  .12907E+02  .62429E+00  .36347E-01  .53005E-01
 3234  .14773E+02  .69420E+00  .70441E-01  .56396E-01
 3234  .16669E+02  .77303E+00  .11174E+00  .70755E-01
 3234  .18549E+02  .83692E+00  .15649E+00  .82687E-01
 3234  .20777E+02  .92121E+00  .21985E+00  .91936E-01
 3234  .22665E+02  .99296E+00  .28267E+00  .10436E+00
 3234  .24577E+02  .10561E+01  .34693E+00  .11533E+00
 3235 -.10227E+02 -.36086E+00 -.12558E+00  .26139E-01
 3235 -.54776E+01 -.12389E+00 -.16240E+00  .30360E-01
 3235 -.69107E+00  .86160E-01 -.17570E+00  .31808E-01
 3235  .43785E+01  .27930E+00 -.16153E+00  .39716E-01
 3235  .63495E+01  .35724E+00 -.14858E+00  .43508E-01
 3235  .82829E+01  .43825E+00 -.13100E+00  .47956E-01
 3235  .10391E+02  .52661E+00 -.10167E+00  .53448E-01
 3235  .12868E+02  .64236E+00 -.61827E-01  .56096E-01
 3235  .14835E+02  .72425E+00 -.24045E-01  .63326E-01
 3235  .16647E+02  .80177E+00  .16621E-01  .73166E-01
 3235  .18590E+02  .87865E+00  .69722E-01  .87974E-01
 3235  .20737E+02  .95139E+00  .12662E+00  .95870E-01
 3235  .22615E+02  .10290E+01  .18763E+00  .10774E+00
 3235  .24579E+02  .10981E+01  .25668E+00  .11971E+00
 3236 -.10347E+02 -.13810E+00 -.51858E-01 -.36931E-01
 3236 -.55372E+01  .53370E-01 -.28739E-01 -.32480E-01
 3236 -.79947E+00  .24153E+00 -.29463E-01 -.23711E-01
 3236  .42702E+01  .40986E+00 -.53798E-01 -.10286E-01
 3236  .62259E+01  .48513E+00 -.72589E-01 -.46610E-02
 3236  .81744E+01  .54569E+00 -.94848E-01 -.25259E-02
 3236  .10259E+02  .61752E+00 -.12577E+00  .11627E-02
 3236  .12676E+02  .71228E+00 -.16941E+00  .84076E-02
 3236  .14649E+02  .77709E+00 -.20893E+00  .18789E-01
 3236  .16579E+02  .83705E+00 -.25216E+00  .30576E-01
 3236  .18478E+02  .90126E+00 -.30589E+00  .42570E-01
 3236  .20596E+02  .97504E+00 -.37048E+00  .57046E-01
 3236  .22564E+02  .10402E+01 -.43560E+00  .70924E-01
 3236  .24459E+02  .10887E+01 -.49931E+00  .83112E-01
 3237 -.10324E+02 -.18677E+00 -.25938E-01 -.35389E-01
 3237 -.55392E+01  .38633E-01 -.53797E-01 -.29446E-01
 3237 -.80657E+00  .23149E+00 -.54286E-01 -.24233E-01
 3237  .41751E+01  .40572E+00 -.29778E-01 -.12969E-01
 3237  .61619E+01  .48058E+00 -.12149E-01 -.53927E-02
 3237  .80863E+01  .54791E+00  .10090E-01 -.38387E-02
 3237  .10265E+02  .64508E+00  .44198E-01  .50433E-02
 3237  .12737E+02  .71915E+00  .84237E-01  .90181E-02
 3237  .14667E+02  .78816E+00  .12302E+00  .17751E-01
 3237  .16558E+02  .84843E+00  .16627E+00  .31241E-01
 3237  .18366E+02  .91178E+00  .21484E+00  .42850E-01
 3237  .20620E+02  .10025E+01  .28458E+00  .58915E-01
 3237  .22575E+02  .10626E+01  .34809E+00  .67181E-01
 3237  .24579E+02  .11250E+01  .41856E+00  .82430E-01
 3239 -.10341E+02 -.88879E-01  .33247E-01 -.63401E-01
 3239 -.55282E+01  .12323E+00  .13099E-01 -.55111E-01
 3239 -.78850E+00  .31120E+00  .18256E-01 -.48569E-01
 3239  .23358E+01  .41604E+00  .34356E-01 -.40823E-01
 3239  .41866E+01  .47264E+00  .48697E-01 -.34213E-01
 3239  .61408E+01  .54527E+00  .69328E-01 -.27161E-01
 3239  .80585E+01  .60815E+00  .93473E-01 -.23750E-01
 3239  .10410E+02  .69681E+00  .13223E+00 -.19402E-01
 3239  .12712E+02  .78456E+00  .17743E+00 -.11205E-01
 3239  .14646E+02  .84545E+00  .21801E+00 -.18332E-02
 3239  .16473E+02  .89630E+00  .26131E+00  .11076E-01
?
```

(a) Initial portion.

Figure 10.- Partial contents of file H1344.

```
3424  .54545E+01  .64894E+00  .69055E-01 -.56333E-01
3424  .10224E+02  .81018E+00  .14307E+00 -.40941E-01
3424  .14949E+02  .97942E+00  .24177E+00 -.29149E-01
3424  .18734E+02  .10828E+01  .33015E+00 -.10267E-01
3424  .22559E+02  .11881E+01  .44427E+00 -.66949E-02
3424  .24512E+02  .12327E+01  .51139E+00  .29964E-02
3424  .26321E+02  .13056E+01  .59180E+00  .64716E-02
3424  .28373E+02  .13529E+01  .67978E+00  .42492E-02
3424  .30232E+02  .14164E+01  .77653E+00  .13451E-01
3424  .32087E+02  .14355E+01  .85110E+00  .26571E-01
3424  .34014E+02  .14890E+01  .93871E+00  .23675E-01
3425 -.41239E+01  .28427E+00  .42176E-01 -.70646E-01
3425  .76421E+00  .46528E+00  .61616E-01 -.64092E-01
3425  .55236E+01  .60818E+00  .10450E+00 -.45467E-01
3425  .10256E+02  .77944E+00  .17773E+00 -.30456E-01
3425  .14877E+02  .92253E+00  .27047E+00 -.15995E-01
3425  .18840E+02  .10347E+01  .36525E+00  .17560E-02
3425  .22541E+02  .11396E+01  .48342E+00  .28718E-03
3425  .24532E+02  .12163E+01  .56576E+00  .56764E-02
3425  .26405E+02  .12856E+01  .64479E+00  .99493E-02
3425  .28302E+02  .13211E+01  .71740E+00  .12237E-01
3425  .30262E+02  .13801E+01  .81333E+00  .26515E-01
3425  .32037E+02  .13998E+01  .88505E+00  .22038E-01
3425  .34005E+02  .14060E+01  .93845E+00  .31474E-01
3426 -.41432E+01  .20138E+00  .58590E-01 -.28644E-01
3426  .69929E+00  .34547E+00  .70120E-01 -.15463E-01
3426  .54563E+01  .51801E+00  .11008E+00 -.79797E-02
3426  .10342E+02  .69811E+00  .18018E+00  .70130E-02
3426  .14899E+02  .82353E+00  .27213E+00  .13407E-01
3426  .18796E+02  .96249E+00  .38461E+00  .23066E-01
3426  .22609E+02  .11130E+01  .53327E+00  .35631E-01
3426  .24408E+02  .11544E+01  .59933E+00  .43692E-01
3426  .26325E+02  .11610E+01  .65126E+00  .59303E-01
3426  .28298E+02  .11735E+01  .70985E+00  .76730E-01
3426  .30136E+02  .12173E+01  .78229E+00  .99414E-01
3426  .32052E+02  .12243E+01  .83887E+00  .10969E+00
3426  .33956E+02  .12543E+01  .91308E+00  .10953E+00
3427 -.41559E+01  .58048E+00 -.14488E-01 -.11968E+00
3427  .66297E+00  .79277E+00  .32062E-01 -.12306E+00
3427  .55350E+01  .94468E+00  .10501E+00 -.10074E+00
3427  .10226E+02  .11228E+01  .20284E+00 -.84830E-01
3427  .14874E+02  .12780E+01  .31930E+00 -.71269E-01
3427  .18805E+02  .13927E+01  .43417E+00 -.56957E-01
3427  .22628E+02  .14792E+01  .55662E+00 -.40151E-01
3427  .24510E+02  .15135E+01  .62707E+00 -.36261E-01
3427  .26400E+02  .15542E+01  .69987E+00 -.23908E-01
3427  .28272E+02  .15754E+01  .77508E+00 -.13929E-01
3427  .30137E+02  .16060E+01  .85930E+00 -.13814E-02
3427  .32337E+02  .16447E+01  .96810E+00 -.10912E-02
3427  .33937E+02  .16667E+01  .10307E+01  .19635E-01
3428 -.40558E+01  .47119E+00  .38145E-01 -.88798E-01
3428  .76484E+00  .67502E+00  .73128E-01 -.88160E-01
3428  .55206E+01  .82152E+00  .13281E+00 -.71154E-01
3428  .10350E+02  .98962E+00  .22272E+00 -.53863E-01
3428  .14924E+02  .11340E+01  .32701E+00 -.41505E-01
3428  .18714E+02  .12304E+01  .43025E+00 -.30260E-01
3428  .22539E+02  .13209E+01  .54455E+00 -.95129E-02
3428  .24448E+02  .13562E+01  .60789E+00  .40878E-03
3428  .26371E+02  .13987E+01  .68420E+00  .89889E-02
3428  .28324E+02  .14330E+01  .75768E+00  .20294E-01
3428  .30228E+02  .14737E+01  .84725E+00  .36138E-01
3428  .32082E+02  .14910E+01  .93022E+00  .36295E-01
3428  .33986E+02  .15027E+01  .99130E+00  .56572E-01
```

```
3429 -.41145E+01  .47052E+00  .69525E-01 -.96734E-01
3429  .76070E+00  .63090E+00  .10221E+00 -.89250E-01
3429  .55047E+01  .75580E+00  .15555E+00 -.59685E-01
3429  .10260E+02  .89452E+00  .23886E+00 -.41006E-01
3429  .14968E+02  .10349E+01  .35268E+00 -.23230E-01
3429  .18749E+02  .11515E+01  .46342E+00 -.10991E-01
3429  .22614E+02  .12358E+01  .58541E+00 -.36377E-02
3429  .24496E+02  .12577E+01  .64238E+00  .18674E-01
3429  .26516E+02  .12638E+01  .70324E+00  .28063E-01
3429  .28300E+02  .12748E+01  .76347E+00  .44857E-01
3429  .30264E+02  .13263E+01  .85321E+00  .55991E-01
3429  .32184E+02  .13712E+01  .94841E+00  .52079E-01
3429  .33983E+02  .13975E+01  .10113E+01  .78730E-01
3430 -.41742E+01  .64949E+00 -.33982E-01 -.14678E+00
3430  .66191E+00  .85531E+00  .16887E-01 -.14216E+00
3430  .54966E+01  .10017E+01  .89529E-01 -.11201E+00
3430  .10249E+02  .11687E+0.  .19208E+00 -.97575E-01
3430  .14818E+02  .13210E+0.  .31551E+00 -.81493E-01
3430  .18697E+02  .14290E+01  .43360E+00 -.70230E-01
3430  .22520E+02  .15251E+01  .56193E+00 -.58009E-01
3430  .24459E+02  .15848E+01  .64253E+00 -.48772E-01
3430  .26373E+02  .16018E+01  .71645E+00 -.41920E-01
3430  .28289E+02  .16368E+01  .79862E 00 -.32299E-01
3430  .30194E+02  .16882E+01  .90959E+00 -.38619E-01
3430  .32116E+02  .17212E+01  .99440E+00 -.16224E-01
3430  .33948E+02  .17209E+01  .10593E+01 -.12887E-02
3431 -.41371E+01  .56698E+00  .20573E-01 -.12252E+00
3431  .59765E+00  .75651E+00  .63403E-01 -.11634E+00
3431  .54557E+01  .87855E+00  .12543E+00 -.85309E-01
3431  .10223E+02  .10340E+01  .21921E+00 -.65724E-01
3431  .14880E+02  .11748E+01  .33335E+00 -.53776E-01
3431  .18624E+02  .13053E+01  .44746E+00 -.43036E-01
3431  .22501E+02  .13983E+01  .57388E+00 -.29435E-01
3431  .24480E+02  .14379E+01  .64643E+00 -.27686E-01
3431  .26277E+02  .14870E+01  .72134E+00 -.16198E-01
3431  .28225E+02  .15275E+01  .80632E+00 -.65213E-02
3431  .30176E+02  .15466E+01  .89446E+00 -.90100E-02
3431  .32043E+02  .15818E+01  .97874E+00  .14443E-01
3431  .33938E+02  .15949E+01  .10461E+01  .34332E-01
99999
  555 -.10047E+02 -.55321E-01  .94683E-01 -.10479E-02
  555 -.81915E+01  .22980E-01  .82528E-01  .22478E-02
  555 -.62054E+01  .87352E-01  .75219E-01  .47709E-02
  555 -.42436E+01  .15798E+00  .70062E-01  .99103E-02
  555 -.23023E+01  .23069E+00  .69657E-01  .12126E-01
  555 -.35951E+00  .30500E+00  .73307E-01  .80701E-02
  555  .14943E+01  .37281E+00  .81665E-01  .97686E-02
  555  .35176E+01  .44201E+00  .95912E-01  .10185E-01
  555  .55807E+01  .53118E+00  .11639E+00  .16644E-01
  555  .71907E+01  .58003E+00  .13294E+00  .21919E-01
  555  .93234E+01  .64934E+00  .15771E+00  .27087E-01
  555  .14550E+02  .79967E+00  .24412E+00  .37988E-01
  555  .19388E+02  .95097E+00  .37238E+00  .49815E-01
  555  .24480E+02  .11167E+01  .52728E+00  .79526E-01
99999
 2111 -.50322E+01  .14037E+00  .45283E-01 -.70194E-01
 2111  .12550E-01  .33898E+00  .61472E-01 -.53701E-01
 2111  .50047E+01  .53824E+00  .10750E+00 -.40929E-01
 2111  .99783E+01  .72156E+00  .18552E+00 -.20167E-01
 2111  .14981E+02  .88976E+00  .29985E+00  .18930E-01
 2111  .17966E+02  .97875E+00  .38612E+00  .46853E-01
 2111  .19931E+02  .10492E+01  .45267E+00  .68181E-01
 -END OF FILE-
?
```

(b) Final portion.

Figure 10.- Concluded.

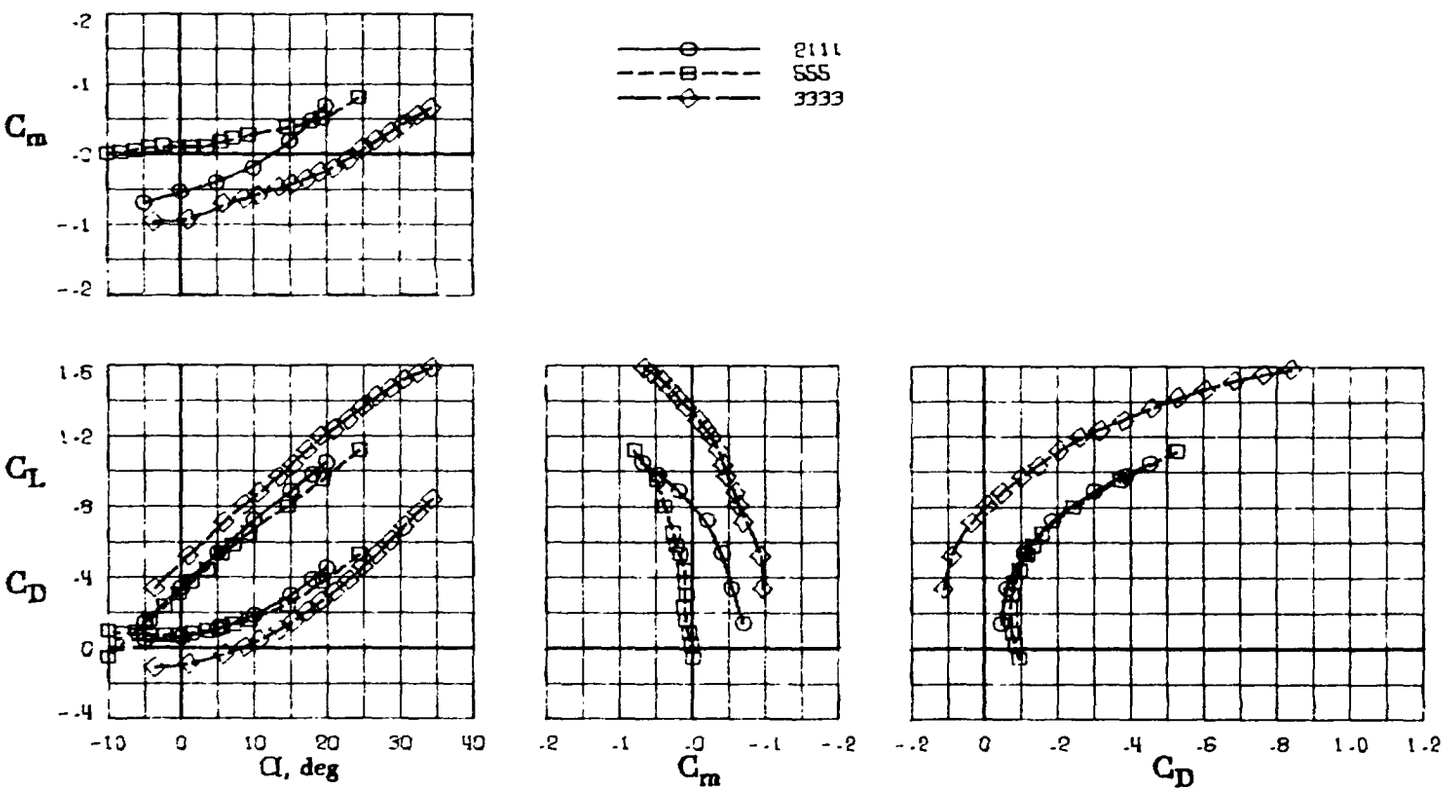


Figure 11.- Final-publication figure returned after remote-batch post processing of file H1222.

```
GET,SHORT/UN=397868N

READY.
CALL,SHORT


 YOU ARE NOW EXECUTING PROGRAM 'DATAPLT',
 WHICH PREPARES A LONGITUDINAL SAVPLT FILE.

 DO YOU WANT BOTH SYMBOLS AND LINES
? NO
 DO YOU WANT SYMBOLS ONLY
? NO
 DO YOU WANT LINES ONLY
? NO
 ONE OF THE LAST 3 QUESTIONS MUST BE ANSWERED YES.

 PLEASE TRY AGAIN.

 DO YOU WANT BOTH SYMBOLS AND LINES
? YES
 DO YOU WANT THE LINES SMOOTHED THROUGH THE DATA
? YES
 DO YOU WANT THE OPTIONAL L/D PLOT
? YES
 DO YOU WANT TO ALTER ANY PLOTTING PARAMETERS
? YES
```

(a) Commence executing SHORT and initial messages in operating program DATAPLT.

Figure 12.- Display presentations during execution of procedure file SHORT.

```
 THE CURRENT VALUES OF THE PLOT PARAMETERS ARE:
1$IN
0ISYM    = 1, 2, 3, 4, 5, 6, 7, 8, 9,
0CLSCL   = .4E+00,
0CLMIN   = -.4E+00,
0CLMAX   = .16E+01,
0CLDV    = .4E+00,
0CLGRD   = .2E+00,
0CDSCL   = .2E+00,
0CDMIN   = -.2E+00,
0CDMAX   = .12E+01,
0CDDV    = .2E+00,
0CDGRD   = .1E+00,
0CMSCL   = .1E+00,
0CMMIN   = -.2E+00,
0CMMAX   = .2E+00,
0CMDV    = .1E+00,
0CMGRD   = .5E-01,
0ALSCL   = .1E+02,
0ALMIN   = -.1E+02,
0ALMAX   = .4E+02,
0ALDV    = .1E+02,
0ALGRD   = .5E+01,
0DLSCL   = .2E+01,
0DLMIN   = -.4E+01,
0DLMAX   = .8E+01,
0DLDV    = .2E+01,
0DLGRD   = .1E+01,
0$END
 DO YOU WANT TO CHANGE ISYM(I)
? YES
 TYPE IN THE NEW VALUE OF ISYM(1)
? 8
 TYPE IN THE NEW VALUE OF ISYM(2)
? 4
```

(b) Display of current values of plotting parameters and alteration of ISYM.

Figure 12.- Continued.

```
 TYPE IN THE NEW VALUE OF ISYM(3)
? 0
 DO YOU WISH TO CHANGE ANY   CL  PARAMETERS
? YES
 DO YOU WANT TO CHANGE CLSCL
? YES
 TYPE IN THE NEW VALUE OF CLSCL
? 0.2
 DO YOU WANT TO CHANGE CLMIN
? YES
 TYPE IN THE NEW VALUE OF CLMIN
? -0.2
 DO YOU WANT TO CHANGE CLMAX
? YES
 TYPE IN THE NEW VALUE OF CLMAX
? 1.2
 DO YOU WANT TO CHANGE CLDV
? YES
 TYPE IN THE NEW VALUE OF CLDV
? 0.2
 DO YOU WANT TO CHANGE CLGRD
? YES
 TYPE IN THE NEW VALUE OF CLGRD
? 0.1
 DO YOU WISH TO CHANGE ANY   CD  PARAMETERS
? YES
 DO YOU WANT TO CHANGE CDSCL
? YES
 TYPE IN THE NEW VALUE OF CDSCL
? 0.1
 DO YOU WANT TO CHANGE CDMIN
? YES
```

(c) Start of alteration of plotting parameters.

Figure 12.- Continued.

```
 TYPE IN THE NEW VALUE OF CDMIN
? 0.0
 DO YOU WANT TO CHANGE CDMAX
? YES
 TYPE IN THE NEW VALUE OF CDMAX
? 0.6
 DO YOU WANT TO CHANGE CDDV
? YES
 TYPE IN THE NEW VALUE OF CDDV
? 0.1
 DO YOU WANT TO CHANGE CDGRD
? YES
 TYPE IN THE NEW VALUE OF CDGRD
? 0.05
 DO YOU WISH TO CHANGE ANY   CM  PARAMETERS
? YES
 DO YOU WANT TO CHANGE CMSCL
? NO
 DO YOU WANT TO CHANGE CMMIN
? YES
 TYPE IN THE NEW VALUE OF CMMIN
? -0.1
 DO YOU WANT TO CHANGE CMMAX
? YES
 TYPE IN THE NEW VALUE OF CMMAX
? 0.1
 DO YOU WANT TO CHANGE CMDV
? END
 DO YOU WISH TO CHANGE ANY ALPHA PARAMETERS
? YES
 DO YOU WANT TO CHANGE A SCL
? NO
 DO YOU WANT TO CHANGE ALMIN
? NO
```

(d) Continuation of alteration of plotting parameters.

Figure 12.- Continued.

```
 DO YOU WANT TO CHANGE ALMAX
? YES
 TYPE IN THE NEW VALUE OF ALMAX
? 30.
 DO YOU WANT TO CHANGE ALDV
? END
 DO YOU WISH TO CHANGE ANY  L/D  PARAMETERS
? YES
 DO YOU WANT TO CHANGE DLSCL
? YES
 TYPE IN THE NEW VALUE OF DLSCL
? 1.0
 DO YOU WANT TO CHANGE DLMIN
? YES
 TYPE IN THE NEW VALUE OF DLMIN
? -1.0
 DO YOU WANT TO CHANGE DLMAX
? YES
 TYPE IN THE NEW VALUE OF DLMAX
? 6.0
 DO YOU WANT TO CHANGE DLDV
? YES
 TYPE IN THE NEW VALUE OF DLDV
? 1.0
 DO YOU WANT TO CHANGE DLGRD
? YES
 TYPE IN THE NEW VALUE OF DLGRD
? 0.5
```

(e) Completion of alterations to plotting parameters.

Figure 12.- Continued.

```
 THE NEW VALUES OF THE PLOT PARAMETERS ARE:
1$IN
0ISYM    = 8, 4, 3, 4, 5, 6, 7, 8, 9,
0CLSCL   = .2E+00,
0CLMIN   = -.2E+00,
0CLMAX   = .12E+01,
0CLDV    = .2E+00,
0CLGRD   = .1E+00,
0CDSCL   = .1E+00,
0CDMIN   = 0.0,
0CDMAX   = .6E+00,
0CDDV    = .1E+00,
0CDGRD   = .5E-01,
0CMSCL   = .1E+00,
0CMMIN   = -.1E+00,
0CMMAX   = .1E+00,
0CMDV    = .1E+00,
0CMGRD   = .5E-01,
0ALSCL   = .1E+02,
0ALMIN   = -.1E+02,
0ALMAX   = .3E+02,
0ALDV    = .1E+02,
0ALGRD   = .5E+01,
0DLSCL   = .1E+01,
0DLMIN   = -.1E+01,
0DLMAX   = .6E+01,
0DLDV    = .1E+01,
0DLGRD   = .5E+00,
0$END
 DO YOU NEED FURTHER REVISIONS
? NO
```

(f) Revised plotting parameters.

Figure 12.- Continued.

```
 STATE FIRST RUN NO., USING A DECIMAL POINT.
? 2111.
 RUN  2111 HAS BEEN PLOTTED.
 ENTER NEXT RUN. (USE 0. TO END PLOTTING.)
? 555.
 RUN   555 HAS BEEN PLOTTED.
 ENTER NEXT RUN. (USE 0. TO END PLOTTING.)
? 0.

 SAVPLT TAPE IS COMPLETE.


 YOU ARE NOW EXECUTING PROGRAM 'LOOK',
 WHICH PLOTS A SAVPLT FILE ON THE TUBE.
 TO BYPASS PROGRAM, USE MAGNIFICATION=0.
 TO CONTINUE AFTER PLOT, PUSH CR.

 WHAT IS YOUR CURRENT BAUD RATE

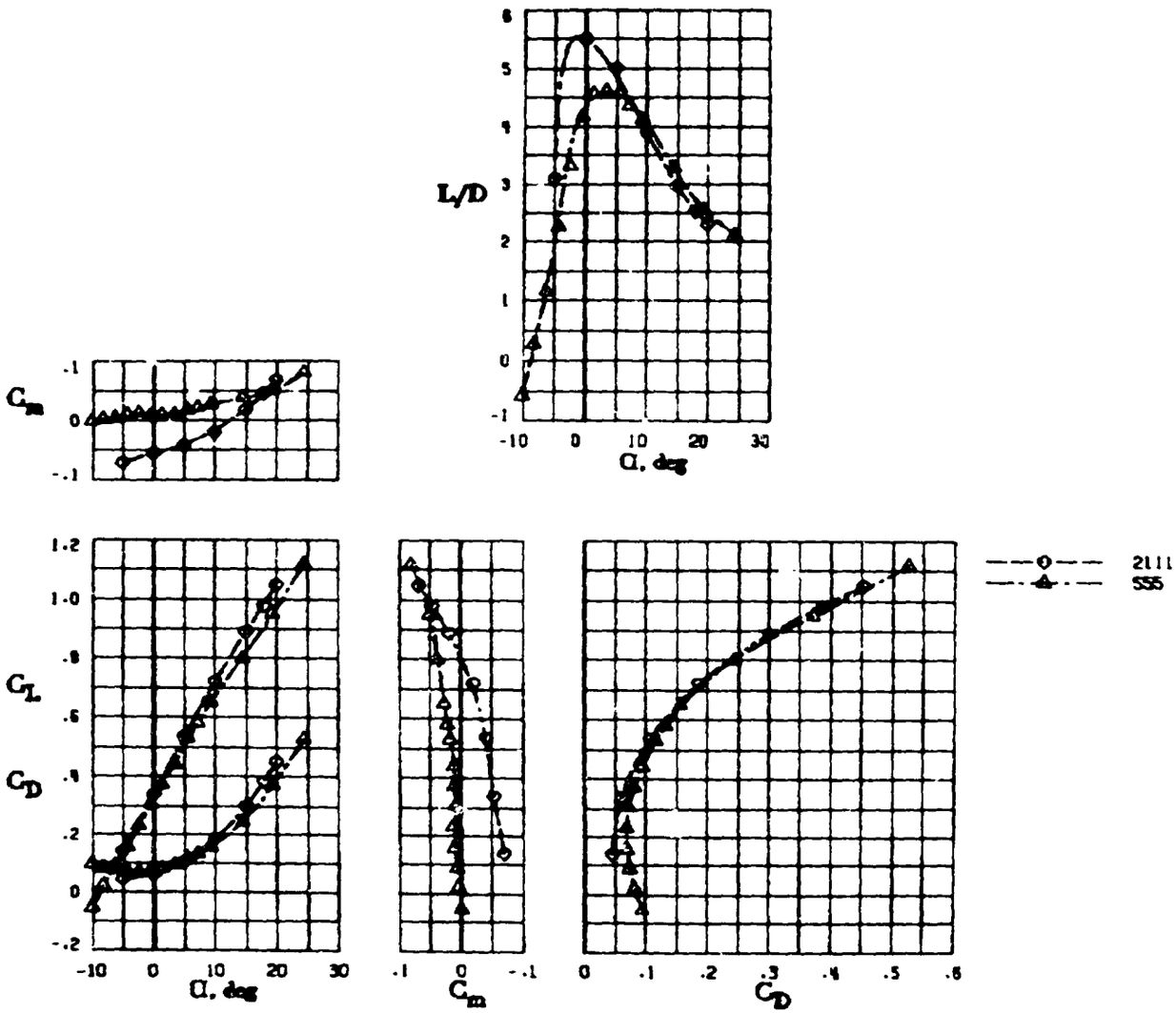
? 1200


 NOW, WHAT MAGNIFICATION DO YOU WANT

? 0.6
```

(g) Selection of run numbers and messages during execution of LOOK.

Figure 12.- Continued.



(h) Display of figure on graphics terminal.

Figure 12.- Continued.

```
15.32.51.$CHARGE,[redacted],LRC.
15.33.06.GET,SHORT/UN=397868N.
15.33.15.$CALL,SHORT.
15.33.15.CLEAR.
15.33.15.GET,TAPE1=H1344.
15.33.17.GET,DATAPLT/UN=397868N.
15.33.21.DATAPLT.
15.42.45.     STOP
15.42.45.     11.987 CP SECONDS EXECUTION TIME
15.42.45.REPLACE,SAVPLT=H1222.
15.42.47.RETURN,DATAPLT.
15.42.47.GET,LOOK.
15.42.50.LOOK.
15.43.17.TT40, ASSIGNED TO TTPE16.
15.47.40.     STOP
15.47.40.      3.036 CP SECONDS EXECUTION TIME
15.47.40.GET,PLOTJOB.
15.47.41.SUBMIT,PLOTJOB,B.
15.47.42.AQGQIZZ
```

(i) Dayfile

Figure 12.- Concluded.

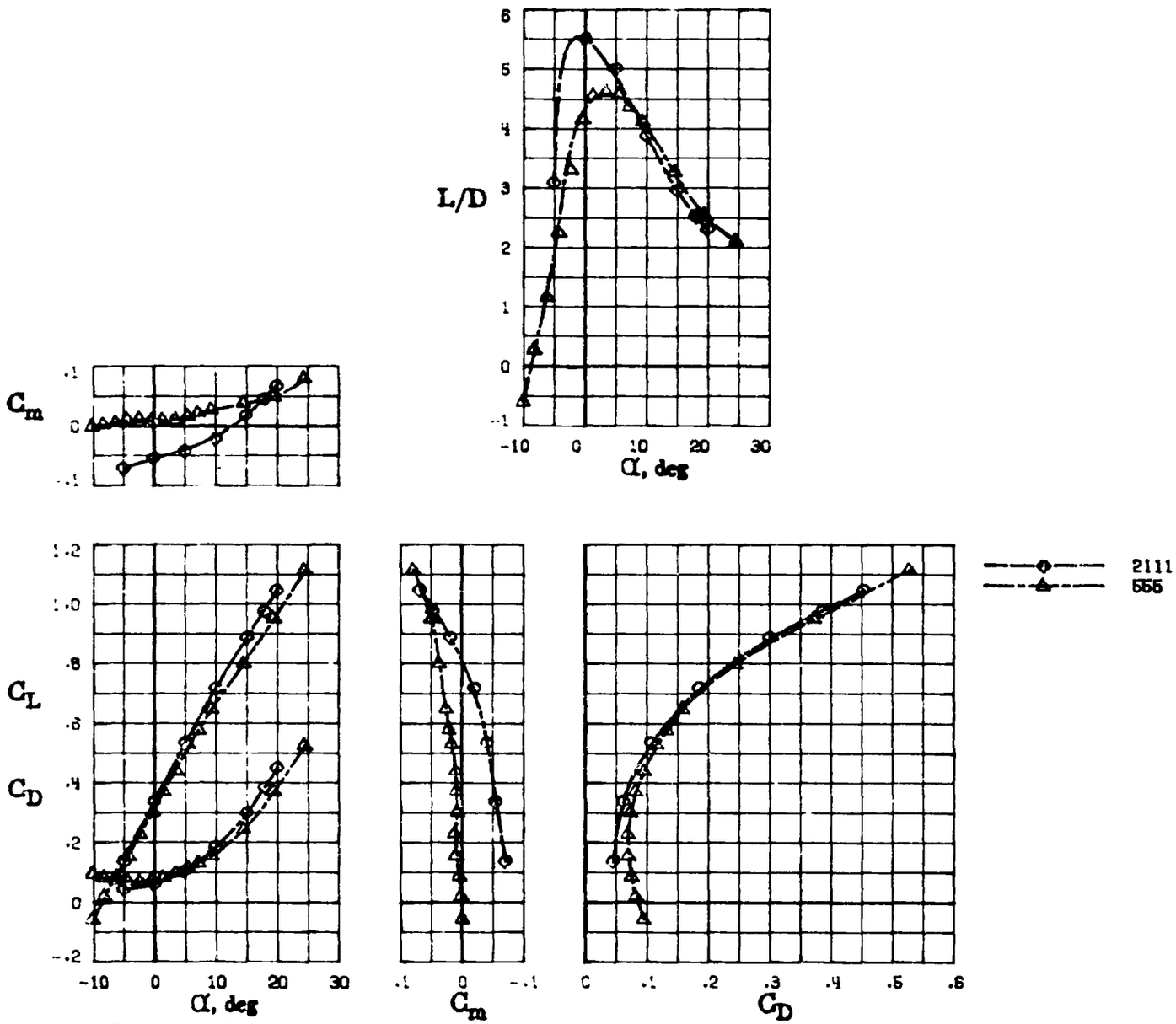


Figure 13.- Final-publication figure returned after remote-batch postprocessing of file H1222.

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15 Supplementary Notes

16 Abstract

A method of maintaining, retrieving, comparing, and plotting wind-tunnel data by means of an interactive remote computer terminal is described. The software associated with the method consists of two procedure files, three computer programs, and a submittal file, all of which are discussed. The procedure is based on maintaining the basic wind-tunnel data files in the Langley standard interface tape (SIFT) format. The SIFT format is not part of the present development; however, those features of the format essential to the present use are described. The entire method is illustrated by sample executions from a remote terminal.

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